COAL AGE

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No matter how powerful the driving energy of a locomotive, it can only pull in proportion to the weight that rests upon its wheels. Take off the weight and the wheels will revolve, but the engine won't pull. *Experience* and *character* in a man are like the necessary weight in a locomotive. A man may have great power, but if he lacks character, he can't move any considerable load.

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We hear a lot about the practical and impractical man. The former is one whose proposals can be accomplished *under existing conditions*. The latter is a person whose ideas can only be made effective by changing conditions. The practical man inquires—*what is best* to do under existing circumstances. The impractical fellow asks—*what is right*. The practical are the doers; the impractical the onlookers. The practical accomplish things. The impractical only want to see what is worth accomplishing. Practical people care most for a certain class, sect, party, organization, or corporation. Impractical people speak for all humanity. What an unfit place this world would be to live in if we were all practical, or if we were all impractical.

* * *

The most misleading and certainly the scariest things in the world today are statistics. The modern scientist can juggle his figures so as to prove beyond doubt that in 1990 A. D. there will be no wood for lumber, coal for fuel or meat for food. Each family will live on a farm 20 ft. x 20 ft., and everyone will have a pair of mechanical wings, necessary because there won't be room to walk on the earth. There will be no churches—religion will have died out—and as to finance three men will own all the money in the world. The thing we seem to forget is that *growth is limited*. When anything gets too big, it becomes top-heavy and falls. It is so with trusts, labor organizations, etc.—they are all "self-busting." Caesar and Napoleon found this idea true. Militarism in Europe is trembling from its very top-heaviness. Its fall may cost the lives of a million men; rivers may run red with human blood, but in the end all nations will be glad to disarm and live in peace.

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A man may have accumulated lots of money and attained industrial success, and still have only a minimum of brains. We are strengthened in this conclusion by the stupid attitude of so-called big business in leaving publicity to its enemies. We may not agree with Haywood, Moyer, Sinclair, Mother Jones, et al., but we admire their ability in the matter of obtaining publicity for their cause, no matter how unrighteous it may be. It is not the event, but the printed facts that live in history.

Successful men are usually specialists; they may know manufacturing, mining or finance, but have no understanding of psychology. Few men deny that today we are sitting on the edge of a volcano. It is no time to cultivate dignity or encourage class distinction. Silence is golden"—for the other fellow. If big business is honest and a desirable thing, if the men in charge are just and humane, now is the hour to say so, and say so, and then again say so.

Our patriotic congressmen, who get their salary regularly whether business is good or bad, send thousands of copies of their rampant speeches to the people at large—all mailed at public expense—which charges are largely paid as taxes by big business itself. As long as employees are trained to believe that the boss is their enemy, just that long will there be industrial war. Either big business deserves what it is getting, or the men at the helm today are something less than captains of industry.

The Goal

By Berton Braley

Written expressly for Coal Age

We're working slowly towards it
—The thing we hope to do,
We've planned and schemed and figured
To make it all come true,
And if the fiscal powers
Will give us half a chance,
We "engineering dreamers"
Will win to our romance.

We learn to put in timbers
That men may safely trust,
We'll conquer ventilation
And deadly damp and dust,
From tipple and from breaker
To where the pumps are placed,
You'll find us grimly fighting
Extravagance and waste.

We pore and fret and study
With purpose straight and stern,
And steadily and surely
We do our work and learn—
Learn we must win our battle
Again and yet again
And fight with Fate and Nature
The Elements and Men!

But 'mid our costly blunders
Our wastes and losses dire,
We still toil on and labor
To reach our heart's desire,
For sure as seas that thunder
And sure as suns that shine,
Some day we'll gain our vision
And make the Perfect Mine!

Commendation and Censure

It is a universally conceded fact that the highest efficiency of any machine organization is obtained when there is the least friction between the working parts.

Mr. Superintendent, you are he head of the organizations of the various plants under your charge. Are these organizations working up to their highest efficiency? Have you reduced the friction in the working parts to a minimum?

You may possess all the prerequisites that experience has established as characteristic of a competent man, but there is a large sized u (you) in luck, which changes the orthography of that word to success or failure.

Your organization is 99 per cent. the reflection and representation of your own individuality.

Is that individuality the narrow, selfish egotism of the "Boss," or is it the universal egotism of the Man?

Gen. Lew Wallace defined a captain as being "A fighting man armed with an army." The metaphor loses nothing in its application to all men in positions of authority.

Do you go among your men in the various departments with a chronic grouch? Do you don your nitroglycerin humor with your working garments? Do you have your blue glasses on from Monday morning until Saturday night? Do you congratulate yourself upon the fact that after a supervision of one of your departments, you have succeeded in making each individual sit up and take notice by impressing him with the fear of your authority?

If censure, alone, be the prominent feature of your relations, you will have an organization that will be merely mechanically operative and precariously adhesive through fear, and it is not fear of your individuality—your displeasure, but a sullen fear of your power, companioned by retaliation when opportunity offers.

Criticism and censure are necessary in any successful organization, but when used in conjunction, they should be preceded and accompanied by sound judgment and common sense.

Commendation is more effective in securing the ultimate perfection of an organization than censure. Have you ever tried it out and marked its effects? When you have found work performed in such a manner that it meets your approbation and proves the proficiency of the workman, have you taken the trouble (?) to give that man the meed of praise which his work merits, or have you simply regarded it as being what it is his duty to produce for the compensation he receives?

It would be well to remember that every man, no matter how humble his station in life may be, possesses an ideal of what he would like to become. The attempt to realize this ideal constitutes ambition. Does it not seem reasonable that a man will become more efficient as a factor if opportunities be afforded for the realization of his ambition? Nothing is so destructive to ambition as continual censure. Nothing is so contributive to it as sincere commendation.

You are not asked to be diplomatic—to indulge in fulsome flattery—but to be just. Express your approbation when your judgment deems it merited.

This will cost you nothing and will return you 100 per cent. in effective results.

Try it. Lubricate the frictional parts with sincere commendation, and let your censure be alloyed with kindness and suggestion. Every man who is worthy of the name, in your organization, will come to regard himself as an essential part of the working whole upon which success or failure depends. Every faculty and power he possesses, both mental and physical will be brought into active operation to produce efficiency. He will be actuated by a righteous fear of losing your appreciation and good opinion because he has learned to appreciate and respect your worth and dignity as a man.

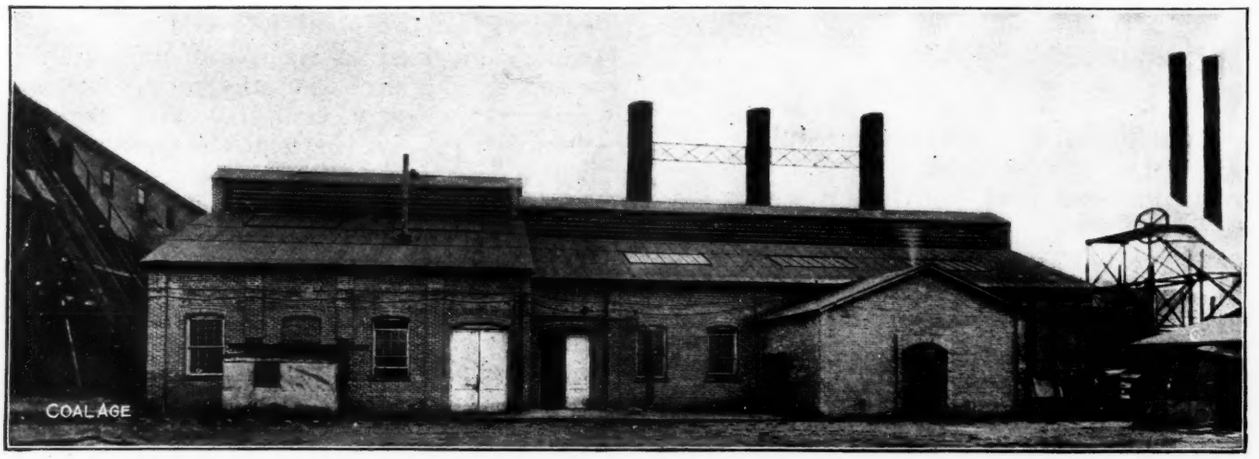
Plant of the Bessemer Coal & Coke Co.

By J. G. Bart*

SYNOPSIS—The improvements made in the firing apparatus made possible the burning of bone instead of coal as well as a material reduction in the amount of labor required for operation.

The power plant of the Bessemer Coal & Coke Co. at Russelton, Penn., is a good illustration of the tendency toward conservation in coal mine operation and the utilization of facilities at hand. The mines of this company are located about 18 miles north of Pittsburgh in Allegheny County, on the Bessemer & Lake Erie R.R., and in what are known as the Twin Freeport seams of coal.

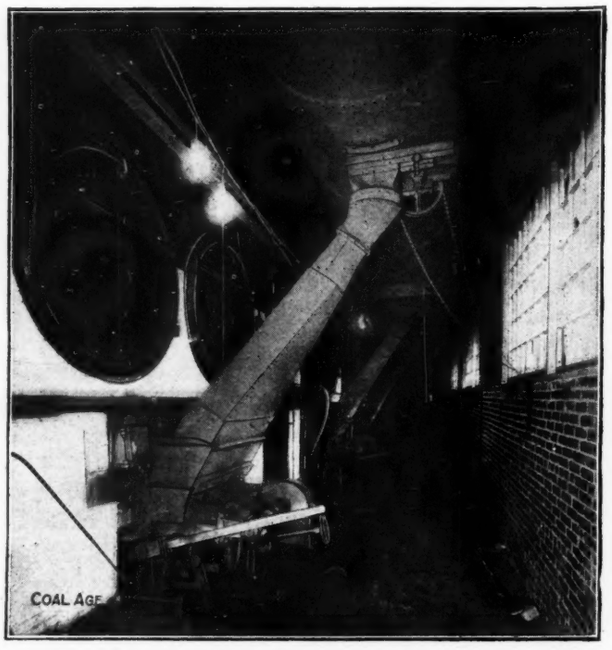
The two seams are about 3½ ft. thick and have between them a binder commonly called bone. This consists of layers of slate and thin strata of coal. In the process of mining, this bone is laid aside by the miners in headings that are to be used for air courses and haulage roads. Formerly this material was loaded on cars, sent to the surface and then hauled away by the railroad for filling. About 60 carloads were produced monthly and the cost of haulage was from $5 to $7 per car. This bone contains about 36 to 40 per cent. ash and averages 8000-9000 B.t.u. per lb. as fired.



General View of Engine and Boiler House

The boiler plant equipment formerly consisted of 8 horizontal return tubular boilers 72 in. in diameter and 18 ft. long, rated at 150 hp. each. Six of these were hand fired, located in one house and equipped with steam jets. The remaining two were in an adjacent house and equipped with a distributing type of coal feeder and

*General superintendent, Bessemer Coal & Coke Co., Russelton, Penn.



The Firing Alley in Front of Boilers

Inside of Furnace, Showing Tuyere Blocks

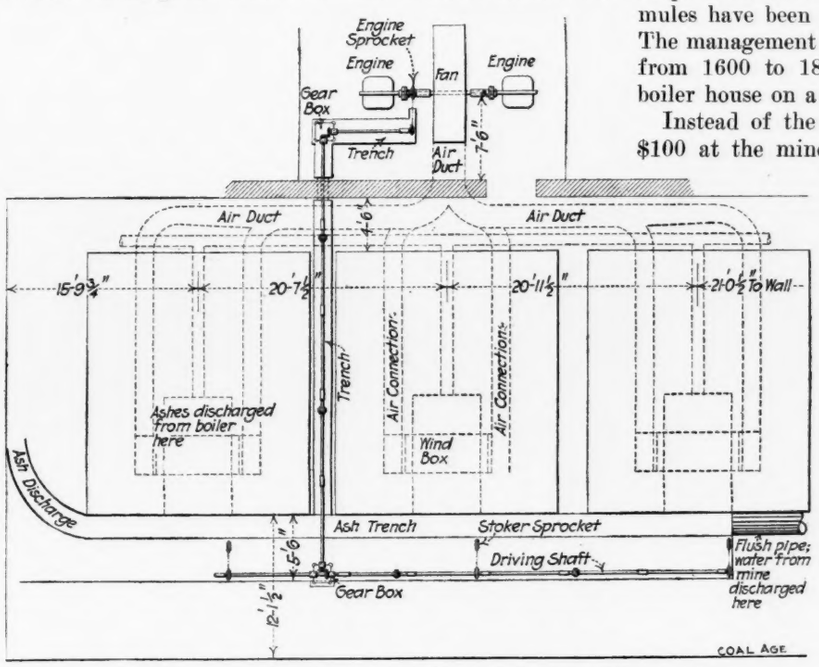
steam jets which had been installed to burn the bone coal.

This had not proven a practical operating proposition due to the large amount of ash in the fuel and all boilers were burning the best slack and ¾-in. nut coal valued at $1 per ton at the mine.

About two years ago the management decided to install stokers in order to burn the bone and also increase the capacity of the plant and reduce the labor charges. To eliminate all labor possible in handling the large amount of ash produced, a self-cleaning type of firing apparatus was essential and it was finally decided to install Taylor stokers under the 6 boilers in one house.

In order to reduce the initial cost of installation it was decided to hang two boilers over one 3-retort stoker. To do this straps were riveted on the sides of the shells in place of the supporting lugs and the drums were hung from "I"-beams, which in turn were supported by columns at the side of the boilers. The two shells were brought to within 6 in. of each other and the space between filled with plastic cement. The distance from bottom of boiler shell to top of tuyeres is 3 ft. 6 in. The distance from top of bridge wall to bottom of drums is 4 ft. This gives a combustion chamber back of the bridge-wall 11 ft. 9 in. wide by approximately 8 ft. long and 5 ft. 6 in. high.

The two boilers over each stoker were equipped with a feed-water regulator and operated as a single unit, for which a separate stack was installed. Automatic regulation of coal feed and air in accordance with the demands for steam by the standard Taylor system was provided.



GENERAL ARRANGEMENT OF BOILERS, FAN STOKERS AND ASH-DISPOSAL TRENCH

THE ASHES ARE FLUSHED FROM THE PITS

A 10-in. stream of drainage water pumped from the mine was available for flushing, so the ash-pits were arranged to slope to a trench running on a line parallel with the front of the boilers. As the plant is located on the top of a considerable elevation, it was only necessary to run the trench to the edge of the hill, where sufficient ground was available to take care of the ashes for an indefinite period.

A crushing and conveying system was installed by which the bone is reduced to 1½ in. and carried from the top of the shaft to the bin over the stokers.

Formerly 8 boilers were required to carry the load and approximately 100 tons of coal per 24-hour run were burned. Ten men were required in the boiler room each 24 hours and owing to the hard firing conditions it was even then difficult to keep firemen.

With the new equipment the six stoker-fired boilers are carrying a materially heavier load than formerly, as the output of the mine has increased 75 per cent. and many mules have been replaced by an electric haulage system. The management states that the boilers frequently deliver from 1600 to 1800 hp. Six men are required in the boiler house on a 24-hour run.

Instead of the 100 tons of marketable coal valued at $100 at the mine, there are now burned approximately 125 tons of bone coal "straight" per day of 24 hours. The cost of disposing of the bone by railroad which formerly ran from $300 to $400 per month is also being saved.

The operation is practically smokeless excepting on extreme loads with an exceptionally poor quality of bone. For a short time while the remainder of the plant was being installed, two units were run on slack coal, when the operation was entirely smokeless.

The maintenance of the steam pressure automatically within 5 lb. of the operating figure has been an important item. The management states that furnace and stoker repairs for over a year during which time the equipment has been in service have been practically nothing. This power plant is now considered one of the most modern in the Pittsburgh district.

Lignite in Montana

As the northeastern portion of Montana is barren of timber except along some of the larger streams, a supply of fuel other than wood is all-important. According to a recent report by the U. S. Geological Survey, thin beds of lignite are exposed along the valley of Poplar River, near Scobey, from which enough fuel may be obtained for local use.

In the vicinity of Plentywood, in the valley of Big Muddy Creek, the beds of lignite are much thicker and contain an amount sufficient not only for the needs of the ranches in that vicinity, but also for shipment to other places as the population increases.

In the region between Scobey and Plentywood, little information regarding lignite was obtainable, as the region is so deeply covered with glacial drift that exposures of the hard rocks can seldom be found. It is probable, however, that even here lignite may be found by shafting.

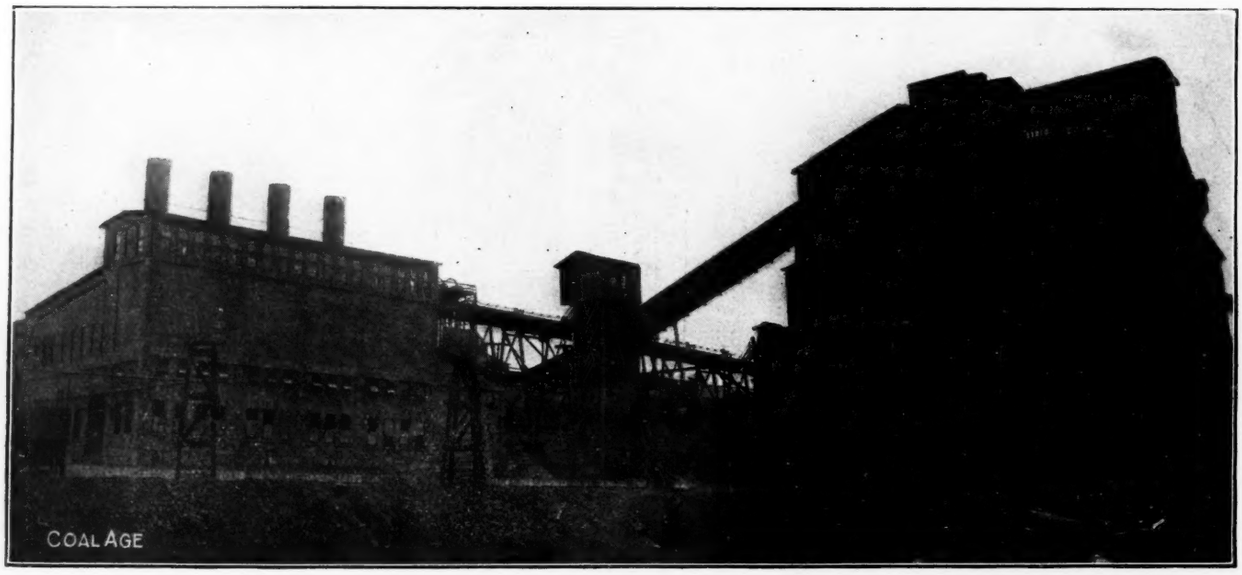
A general description of the field is contained in Bulletin 541-H, of the U. S. Geological Survey, Washington, D. C.

Leaks in the Preparation of Anthracite Coal

By D. M. Hopkins*

SYNOPSIS—Some comments on modern breaker practice from the viewpoint of the practical man.

There are probably few people who appreciate the great importance of this subject. After an experience in breakers dating back to 1889, I feel that I have an intimate knowledge of the subject, and it is my intention to deal with it in a purely practical manner. As a preface to the article, I wish to remind the reader of the great importance of maintaining as large a proportion of the domestic grades as possible, since it is upon these that, essentially, the whole profit of the anthracite operator hinges. As is well known there is little or no profit in the steam sizes.



Bliss Colliery of D. L. & W. R.R. Co., Nanticoke, Penn.

This colliery employs 1100 men, and prepares more than 600,000 tons of coal annually. There was not a single fatal accident at this plant in 1913, which record was undoubtedly due largely to the fact that 66% of the men are students of the Nanticoke Mining School.

Let us first consider certain state laws regulating the manner in which coal shall be handled from the mine to the breaker, about which there is considerable difference of opinion. To reduce the breakage to a minimum, there is no doubt but that the coal should be conveyed in the mine cars directly to the point where it is to be first treated in the breaker without any intermediate dumping.

Treatment in the Breaker

The first operation in the breaker proper consists in screening over either stationary or shaking screens. The shaking screen, as a rule, is the most desirable, since the sizing is more thorough and there is not the violent speed and consequent breakage characteristic of the gravity bar screens. Poor screening is also a result of the latter method, a certain percentage of the domestic grades being carried through with a consequent loss in profits.

The prepared sizes from the screen are passed on to a moving table for preliminary cleaning. It is highly important that adequate facilities be provided to permit of a thorough cleaning at this point, since one piece of impurity may be removed here which, if passed through the roll, may become 40 or 50 distinct pieces, and hence require this much additional treatment. Indeed, it has frequently been an open question in my mind as to whether this phase of the breaker receives the attention it justifies.

From the table the coal is passed on into the roll, which, owing to the exceedingly large sizes which occasionally must be crushed, usually consists of two pairs. To avoid unnecessary crushing, it is customary to screen out the domestic sizes and smaller between the first and second rolls. These latter are usually perforated plate or stationary bars, but I am of the opinion that they should be shaking screens. The rolls are generally of the high-speed toothed variety, ranging in speed from 250 ft. per min. to 1500 ft. per min. It is my opinion that 750 ft. per min. is the speed about best suited for our coal.

It has occurred to me a number of times that we are perhaps devoting too much attention to the speed of the roll and too little to the proper design. Let us take, for example, two types of rolls: The first, 27 in. in diameter by 36 in. long, with teeth located at 2½-in. centers. This class of roll will ordinarly produce 53 per cent. prepared sizes, and under the most favorable conditions 60 per cent. The second type is of the same diameter and length, but the teeth are centered at 3½

*Assistant foreman Bliss mine, D., L. & W. Co., Nanticoke, Penn.

in. and the yield of prepared sizes would be about 81 per cent. Assuming now a colliery having a capacity of 2000 tons per day, the difference in the prepared sizes produced by these two different types of rolls would amount to 252 tons, which, in turn, means a saving of about $756 per day. It is thus obvious that the question of rolls is a most important one.

Notes on Operation of Rolls

Another important consideration in connection with rolls is the period they should be operated, it being the custom here, as is frequently the case around mining operations, to continue working the machine as long as it will hold together. Dull teeth pulverize the coal badly, and it is generally agreed that at the end of a year's service the crusher is producing 5 per cent. less of the prepared grades than was originally the case.

In another instance we installed a rather unusual device to prevent coal from pounding against sheet iron, consisting of old rubber belting bolted to it. In another case, it was found that an important saving was effected by changing certain chutes from a 5- or 6-in. pitch to a 2 or 3 in., and conveying the coal through the increased elevation by means of a spiral. Again, a large saving can be effected by eliminating all right-angle turns in chutes.

While many of these modern improvements are very desirable from a humane standpoint, this unlimited introduction of machinery and the mechanical handling of the coal has had a decided tendency toward deterioration in the process. For instance, let us consider the treatment of egg and stove coal, which is now considered of too inferior a quality to pass inspection. Some of our predecessors evolved the idea of putting these grades back through what was termed the boney roll, where they were reduced to pea, buckwheat, rice and barley that could be passed. The great evil in this practice is that enormous tonnages of what is really good coal is now thrown out in this way by careless slate pickers.

Another condition replete with many undesirable possibilities is the competition between breaker foremen. Let us assume a hypothetical condition of two breakers each producing 50,000 tons per day from the same coal. In one, 50 per cent. of the coal is prepared grades and the cost of preparation is 10c. per ton, making the gross breaker operating charge $5000. The other breaker produces 65 per cent. prepared sizes at a cost of 15c. per ton, making a gross of $7500. Even though the cost of operation at the second breaker is 50 per cent. greater it will be found that, at a selling price of $3.50 per ton, the earnings of the second colliery exceed those of the first by $32,500. It is a case of not the cost per ton as the kind of a ton you produce.

Lake Trade Lifeless

Another month has gone by and, if anything, lake trade is in a worse condition than it was a month ago. There was some hope of an improvement about July 1, but it did not materialize, and, if anything, the trade is more listless than ever. Sales of ore have been extremely light and vessel after vessel has gone into ordinary. Now that the first rush of grain is over, it is clear that there have been too many ships in commission all along for the business offering. No material change is now expected until the fall months. Grain has been carried at figures that leave no profit to the ship and the rates for future chartering are very low. Were it not for the fact that crops are very heavy, there would not be a single ray of sunlight in the whole situation. Scores of mines have shut down, some because they cannot sell the ore and others because they cannot be profitably operated at present prices. All along the line the whole business is being conducted at a loss and there has never been a time when things have been as dull on the lakes as they are now.

Sorry sights are to be seen at all Lake Erie ports. Dozens of ships are moored broadside to broadside behind the breakwaters. Some have been there since the season opened, some have made a trip or two, and some more that are now making trips will be added to the idle fleet as soon as they discharge present cargoes. And some people say that the depression is only sentimental. We wonder what they consider a real depression to be? The depression of 1893 was certainly not as complete as the present one.—*The Marine Review.*

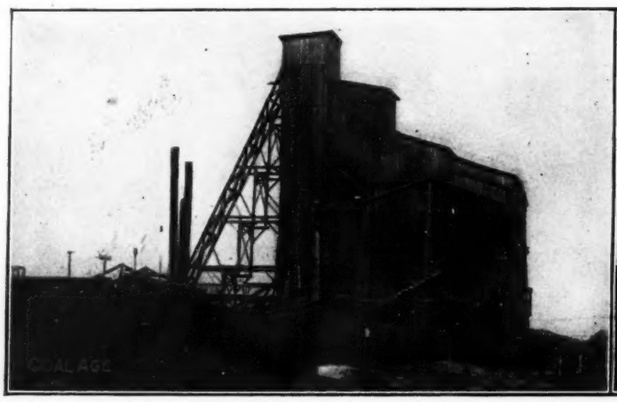
Another View of the D. L. & W. R.R. Co.'s Bliss Colliery, at Nanticoke

Firetrap Headframes in Arkansas

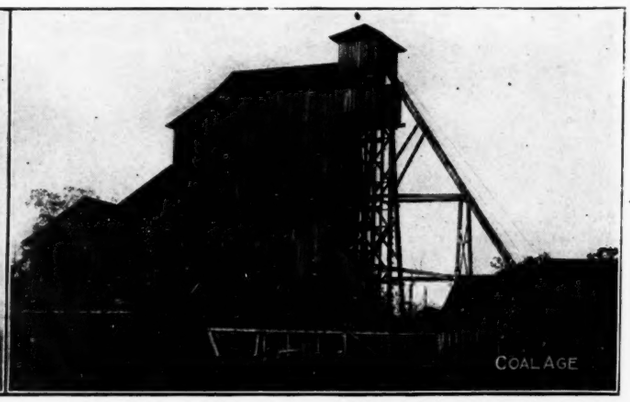
The five firetrap headframes shown in the accompanying illustrations are all in Johnson County, Arkansas, not far from Spadra and Montana near the Arkansas River. It is unfortunate that any such menaces to the lives of the miners have been permitted to be constructed in that state or in any other. Surely the vested rights of the coal companies are in no case so sacred that corporations should be allowed to operate their mines under such hazards.

SUNSHINE MINE OF SPADRA COAL CO.

SUPERIOR ANTHRACITE COAL CO.'S MINE



CONSOLIDATED COAL CO.'S MINE



CLARK-MCWILLIAMS COAL CO.'S MINE

The coal mined is a semi-anthracite and that fact calls to memory the terrible mine fire at Avondale mine, Plymouth, Penn., Sept. 6, 1869, when 179 men were killed as a result of a breaker fire. Consequent on the conflagration, regulations needed, and none too stringent, were passed in Pennsylvania. On May 21, 1871, smoke from a burning breaker destroyed 20 persons in the West Pittston mine, West Pittston, Penn.

These proofs of the danger of rattletrap headframes with extensive headworks should be enough to give operators warning of their danger. The recent fire at the fan house of the Sycamore Coal Co., at Cinderella, near Williamson, W. Va., in which five men were suffocated, only adds to the evidence already overpowering that buildings over mine openings should be fireproof. We are to be congratulated that having so many combustible topworks, the accidents have been so few and so rarely the cause of a large number of deaths, but this immunity may not always be granted us and at any time we may hear of accidents in which many hundreds may be involved. The bare timber headframe is not so much to be reprobated, but when the shaft is surrounded by a group of buildings all highly inflammable and all filled with workingmen who may set fire to the flimsy structures, the danger is extreme especially if the escape shaft is near-by or the shaft thus incumbered is a downcast.

SCRANTON ANTHRACITE COAL CO.'S MINE

Costs and Various Applications of Piping at Coal Mines

W. B. RICHARDS*

SYNOPSIS—A detailed analysis of the cost of piping, worked out on practical rather than theoretical lines, and supplemented by some valuable and original tables. Also notes on the different types of pipe, including spiral riveter, wood, cast iron, etc., with comments on their various usages in and about colliery operations.

The accompanying tables show the complete cost of laying pipe of various types and sizes, being an average of actual cost of such laying under conditions encountered in the Panther Creek valley.

These tables are used as a basis in compiling estimates where excavation is through medium hard clay or soil, with some loose rock and laid under summer conditions. Cost of excavation and back fill for pipe laid in winter weather will run higher than in summer, depending on the depth of the frost in the ground. Length of haul, and conditions of road must be considered, as the cost of carting and distributing largely affects the cost per lineal foot of laying pipe. The average haul in the lines covered by the tables was about three-fourths of a mile. The figures are, of course, approximate, but with careful consideration of conditions under which pipe will be laid, they form a reliable basis for estimating.

TABLE SHOWING COST OF BLACK AND GALVANIZED PIPE LAID IN PLACE AND COSTS OF OTHER VARIETY OF PIPES—1913

	Cost per Foot of Pipe Laid in Place				Cost of Pipe per Foot						
							Steel Pipe				
Diam. of Pipe (In.)	Black	Galvanized	Laying[1]	Total[2]	C.I., B. & S. @ 24c. per Ton	C.I. Flanged Extra Heavy	Black	Galvanized	Spiral Riveted	Wood Pipe	Vitrified Sewer Pipe
	Butt Weld										
¼	$0.023	$0.0326	$0.30	$0.33			$0.023	$0.0326			
1	0.034	0.0483	0.30	0.35			0.034	0.0483			
1¼	0.046	0.066	0.30	0.37			0.046	0.066			
1½	0.055	0.079	0.31	0.39			0.055	0.079			
2	0.072	0.107	0.31	0.42			0.072	0.107		$0.16	
	Lap Weld										
2½	$0.129	$0.178	$0.31	$0.50			0.129	0.178			
3	0.168	0.233	0.32	0.55			0.168	0.233			
4	0.23	0.332	0.32	0.65	$0.228	$0.25	0.23	0.332	$0.26	0.28	$0.06
5	0.305	0.450	0.32	0.75			0.305	0.45			
6	0.422	0.582	0.32	0.91	0.384		0.422	0.582	0.43	0.41	0.09
7	0.595	0.85	0.33	1.18			0.595	0.85			
8	0.625	0.89	0.33	1.24	0.576	0.55	0.625	0.89	0.57	0.53	0.13
10	1.03	1.46	0.35	1.81	0.816	2.20	1.03	1.46	0.84	0.64	0.18
11	1.13	1.64	0.36	2.00			1.13	1.64			
12	1.27	1.82	0.37	2.29	1.044	2.97				0.75	0.23
14					1.308	7.64	1.27	1.82	1.21	0.87	
15											0.31
16					1.608					0.97	
18									2.00	1.09	0.44
20									2.18	1.35	0.52
24									2.58	1.77	0.75

Note—In winter excavation and back fill will cost twice as much.
[1]Includes handling, excavating. [2]Equals the total cost per foot of galvanized pipe laid 5 ft. in the ground.

PURPOSE AND CONDITIONS FOR WHICH TYPES OF PIPES ARE BEST ADAPTED

Cast-iron pipe, with ball and spigot joint, is the most widely used type for water pipes. By reason of its moderate cost, and durability, it is almost universally employed in water-distributing systems and various other special forms of distribution. The sizes commonly used run from 4 to 24 in. in diameter. The different grades are designated according to class as follows:

Class	Designed For Ft. Head	Lb. per Sq.In.	Class	Designed For Ft. Head	Lb. per Sq.In.
A	100	43	C	300	130
B	200	86	D	400	173

Cast-iron pipe, bell and spigot joint, is used in conducting water from reservoirs in Nesquehoning valley to Lansford and Coal Dale boroughs, the sizes varying from 4 to 12 in. in diameter.

Spiral riveted galvanized pipe, 18 in. in diameter, is used in conducting water from Hauto reservoir to Hauto pumping plant, under a head of 40 ft. This pipe is an emergency line laid on the surface; the pumping plant receives water regularly from a channel below the overflow of Hauto reservoir, but in times of drought it is necessary to draw from the dam, through this spiral riveted pipe. Second-hand spiral pipe is frequently used for culverts under public roads.

Spiral riveted galvanized pipe is used extensively in ventilating tunnels and gangways in which there are no return airways. A system in general use is to place an electric booster fan to drive air through an 18-in. pipe to the face of the tunnel or gangway, and allow the air to return out the tunnel or gangway, until a hole is driven to the surface or the upper level, when the fan is moved nearer the face and pipe used again to advance the tunnel or gangway. Gangways and tunnels four miles long have been driven by this method; they are usually ventilated a distance of 2000 ft., when fan must be advanced.

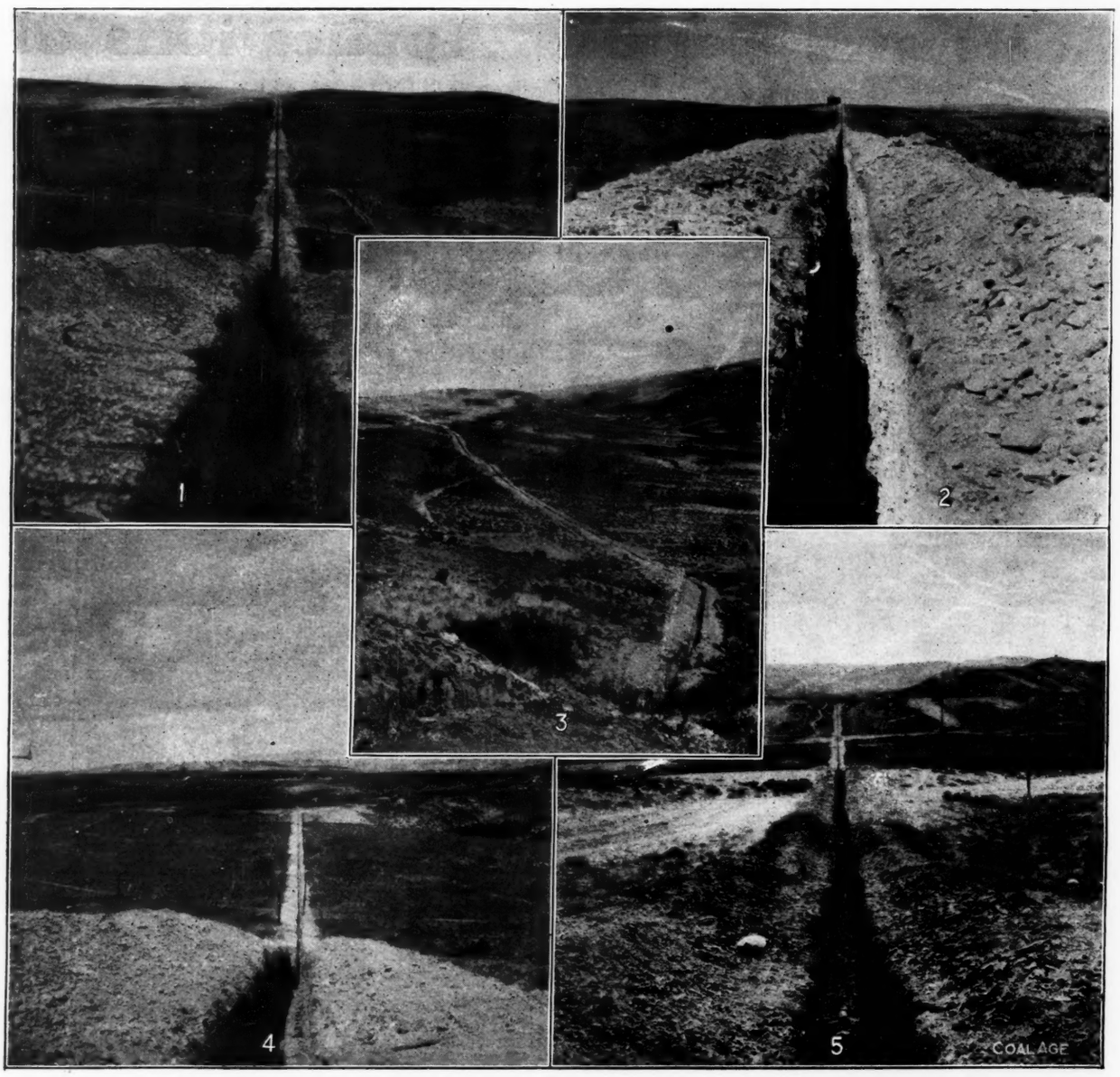
TABLE SHOWING COST OF LAYING VITRIFIED SALT GLAZED SEWER PIPE, 1913

		Per Lineal Foot						
Diam. (In.)	Weight (Lb.)	Cost	Cost of Cement	Excavation and Filling[1]	Laying	Cartage, Distribution and Shipping Loss	Superintendence, Engineers, Etc.	Total
4	9	$0.06	$0.005	$0.35	$0.01	$0.01	$0.04	$0.48
6	15	0.09	0.0075	0.35	0.02	0.01	0.04	0.52
8	23	0.13	0.01	0.35	0.03	0.01	0.04	0.57
10	35	0.18	0.0125	0.35	0.04	0.02	0.04	0.64
12	45	0.23	0.015	0.35	0.05	0.025	0.04	0.70
15	60	0.31	0.0175	0.35	0.06	0.03	0.04	0.80
18	75	0.44	0.02	0.40	0.07	0.04	0.04	1.00
20	100	0.52	0.025	0.40	0.08	0.05	0.04	1.12
24	150	0.75	0.035	0.55	0.09	0.06	0.04	1.52

Note—Where rock is blasted, figure $3 per cu.yd., excavation 60c. per cu.yd., and back fill 20c. per cu.yd. In winter this cost will be doubled for excavation and back fill.
[1] For a trench 5 ft. by 2 ft.

Steel pipe, black, of small sizes, from 1 to 6 in., is used extensively to carry steam to various drive engines, small hoisting engines, steam-heat radiators, etc., in and around

*Mining engineer, Lehigh Coal & Navigation Co., Lansford, Penn.



A Large Water-Works Installation at the Coal Subsidiary of the Amalgamated Copper Co., at Diamondille, Wyo.

Fig. 1 is a view taken from the extremity of the line shown in Fig. 5. Fig. 2 shows the connection to the tank, which latter will also be noted in the left background of Fig. 4. Fig. 3 was taken on the saddle to the left of the intermediate tank, just perceptible against the sky line in the extreme right background of Fig. 5. Figs. 4 and 5 are views taken in opposite directions from the top of the divide, shown against the sky line in Fig. 1. This divide and the saddle from which Fig. 3 was taken were the two high points on the line, which was a gravity system throughout.

coal breakers; also for small water pipe lines where water is not intended for potable use. Steel pipe, galvanized, laid underground, is used to carry potable water for domestic purposes.

Extra-heavy cast-iron pipe is used for column lines through mine shafts and slopes in unwatering the workings. It is also used in breaker practice to conduct wash water to the shaker screens, jigs and lip screens, used in the preparation of the coal. They are made extra heavy, the better to resist the action of the sulphuric acid in the mine water, the added life of an extra-heavy pipe being about twice that of standard weight pipe. This same result is obtained, although at somewhat higher cost, by installing wood-lined, cast-iron pipe for conducting acid water and slush.

Vitrified salt-glazed sewer pipe is commonly used for conducting sewage; its chief use in the anthracite-coal industry is to convey wash water or drainage (particularly aciduous mine water) under team roads and railroads, water from storage dams, into which mine water is delivered, to breaker.

Wood-stave pipe, machine made, from 4 to 14 in. in diameter is used extensively in and around the anthracite mines. A 7000-ft. line of 14-in. wood pipe is now being laid from a slush pump at one of the breakers of the Lehigh Coal & Navigation Co., to a point over a mine fire. Three 8-in. holes, 700 ft. deep, are being drilled from the surface to the area affected by the fire, and the waste water from the breaker, which contains a small per cent. of culm, is to be pumped through this 14-in. wood pipe

line to slush the fire area. Slush or coal dirt will be conveyed by rail to a point about 50 ft. from the drill holes, where it will be dropped into two wooden flumes laid beneath the railroad; the water delivered by the 14-in. wood pipe line will then be turned through a 2½-in. hose on the slush to wash it through the wooden troughs to the drill holes and down into the mine-fire area. By this method it is expected that the fire will in a very short time be extinguished.

TABLE SHOWING DISTRIBUTION OF COSTS IN LAYING WATER PIPE—1913

B. & S. Pipe, 250 Ft. Head, Class "E"			Lead			Hemp Packing			Cost Per Lineal Foot					
Dia. of Pipe (In.)	Wgt. per Length[4] (Lb.)	Wgt. per Lin.Ft. (Lb.)	Pounds: Cost per Lin.Ft.[1]	Pounds: per Joint	Pounds: per Lin.Ft.	Cost per Lin.Ft.[2]	Pounds: per Joint	Pounds: per Lin.Ft.	Cost per Lin.Ft.[3]	Material	Pipe Laying	Haulage	Supt.	Labor	Gross
4	230	19	$0.228	6.5	0.5	$0.03	0.02	0.2	$0.0014	$0.26	$0.03	$0.01	$0.03	$0.315	$0.58
6	380	32	0.384	9.0	0.75	0.045	0.03	0.03	0.0021	0.43	0.04	0.015	0.03	0.33	0.76
8	575	48	0.576	12.0	1.00	0.06	0.045	0.05	0.0035	0.64	0.05	0.02	0.03	0.345	0.99
10	810	68	0.816	15.0	1.25	0.075	0.055	0.07	0.0049	0.90	0.07	0.025	0.03	0.37	1.27
12	1040	87	1.044	18.0	1.50	0.09	0.06	0.075	0.0052	1.14	0.10	0.03	0.03	0.405	1.55
14	1208	109	1.308	24.0	2.00	0.12	0.03	0.08	0.0056	1.43	0.11	0.035	0.03	0.42	1.85
16	1610	134	1.608	30.0	2.50	0.15	0.095	0.085	0.0059	1.76	0.12	0.04	0.03	0.435	2.20

[1] Based on the ruling price in 1913 of $24 per ton. [2] Computed on a basis of 6c. per pound. [3] Computed on a basis of 7c. per pound [4] Includes B. & S. to lay 12 ft.

Note—In winter the cost per lineal foot of laying pipe will be doubled for excavation and back fill.

Excavation and Back Filling—A trench 5 ft. by 2 ft. contains 0.37 cu.yd. per lin.ft. Where excavating costs 4.5c. per cu.yd. the cost per lin.ft. is 17c. Back filling @ 20c. per cu.yd. amounts to 7½c per lin.ft.

Wood pipe is also extensively used in breakers for conveying wash water from the reservoirs to screens and jigs, and in water-works practice to conduct water to the pumping plants. A 23,000-ft. line of 6-in. wood pipe is now being laid over the ground by the Panther Valley Water Co. from a creek in Nesquehoning Valley to the Hauto pumping plant; this is a reserve supply to be used as an aid to the Bear Creek reservoir supply in times of drought. From this is furnished the domestic water supply of Lansford and Coal Dale Boroughs.

TABLE SHOWING COST PER FOOT OF LAYING WOOD PIPE ON SURFACE

200 Ft. Head, 86 Lb. Pressure						
Diam., In.	Weight per Ft., Lb.	Cartage and Distribution	Laying	Superintendence	Cost of Pipe	Total
2	5	$0.065	$0.01	$0.03	$0.16	$0.21
4	10	0.005	0.01	0.03	0.28	0.33
6	11	0.005	0.015	0.03	0.41	0.46
8	14	0.007	0.02	0.03	0.53	0.60
10	18	0.01	0.03	0.03	0.64	0.70
12	20	0.01	0.03	0.03	0.75	0.82
14	25	0.01	0.03	0.03	0.87	0.95
16	28	0.01	0.03	0.03	0.97	1.05
18	31	0.015	0.035	0.03	1.09	1.20
20	36	0.015	0.04	0.03	1.35	1.45
24	45	0.02	0.045	0.03	1.77	1.90

Wrought-iron pipe will stand the following pressures per square inch:

Dia. In.	Lb.	Dia. In.	Lb.
1	1500	6	600
2	1000	8	500
3	900	10	500
4	800	12	500

Safe pressures for cast-iron pipe depend on the thickness of the metal, and runs as follows, where the metal is ½ in. thick:

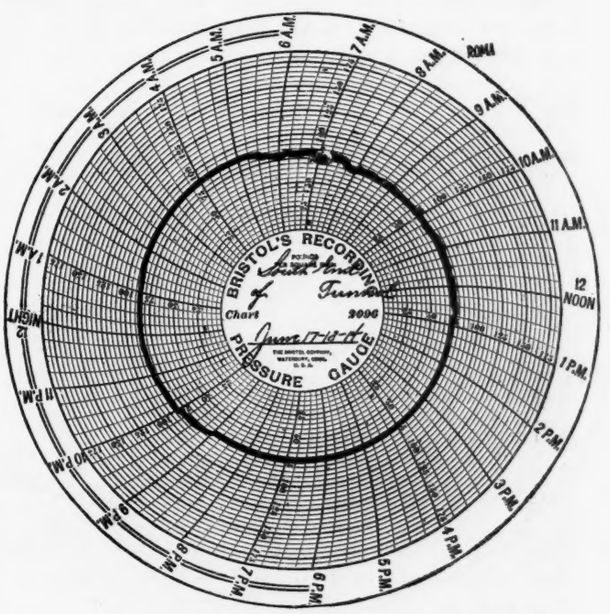
Dia., In.	Lb. per Sq.In.	Dia., In.	Lb. per Sq.In.
4	224	10	44
6	124	12	24
8	74		

Wood-stave pipe is made to stand a pressure up to 300 lb. per sq. in.

Flow of Water in Pipes

In estimating size of pipe required, it must be remembered that friction of liquids in pipes increases as the square of the velocity, and doubling the diameter of a pipe will increase its capacity four times. Frequently, in the case of cast-iron and wrought-iron pipe, the carrying capacity is reduced by the growth of tubercules on the interior about 1 per cent. per annum. In small pipes the deterioration is more rapid. Deterioration of the pipe depends upon the water conducted, clear spring water, turbid river waters, or waters carrying organic matter. Growth on the interior of the pipe can be removed by sending an instrument generally known as a "Go Devil" through the pipe, cutting away the tubercles.

The carrying capacity of spiral riveted pipe is from 10 to 15 per cent. less than cast-iron pipe, owing to the increased friction caused by the laps and projecting rivets. When used for a number of years the inside of wood-stave pipe wears smooth and the friction is decreased. The quantity of water discharged through a pipe depends on the head, i.e., the vertical distance between the level surface of still water in the chamber at the entrance of the pipe, and the level of the center of the discharge end; also upon the length of pipe, the character of its interior surface, as to its smoothness, and upon the number and sharpness of the bends, but it is independent of the position of the pipe, horizontal, inclined upward or downward.



Typical Pressure Gage of Panther Valley Water Co., Showing Fluctuations over a 24-Hr. Period

TABLE SHOWING COST OF LAYING SEWERS IN COAL DALE, CONTRACTORS BARRETT & BRESLIN JAN. 4, 1909

6-in. pipe, per lin.ft., in place	$0.96
8-in. pipe, per lin.ft. in place	1.09
10-in. pipe, per lin.ft. in place	1.35
12-in. pipe, per lin.ft. in place	1.44
12-in. c.i. pipe, per lin.ft. in place	2.95
6-in. "Y," each extra	0.88
8-in. "Y," each extra	0.93
10-in. "Y," each extra	1.25
Man-hole, complete	98.00
Flush tanks	179.00
Concrete, per cu.yd.	7.95
Sheathing, per thousand left in place	28.00
Rock Excavation, per cu.yd.	2.95

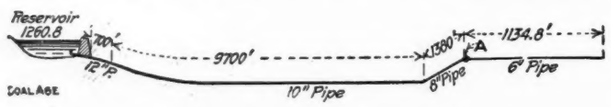
The head, instead of being an actual distance between levels, may be caused by pressure, as by a pump, in which case the head is calculated as a vertical distance, corresponding to the pressure one pound per square inch, equal to 2.309-ft. head, or 1-ft. head equals 0.433 lb. per sq.in. Small pipes with a high rate of flow when using a pump, cause a great loss of power. The head or pressure is what would be indicated by a pressure gage attached to the pipe near the point of delivery. Readings of the gage should be taken while the water is flowing from the pipe.

Friction Loss in Pipes

The following table shows discharge, friction head and velocity of flow through smooth cast-iron pipes, 8, 10 and 12 in. in diameter:

Discharge Gal. per Min.	8-In. Pipe Loss of Head per 1000 Ft.	8-In. Pipe Velocity Ft. per Sec.	10-In. Pipe Loss of Head per 1000 Ft.	10-In. Pipe Velocity Ft. per Sec.	12-In. Pipe Loss of Head per 1000 Ft.	12-In. Pipe Velocity Ft. per Sec.
200	1.1	1.3	0.35	0.82	0.14	0.57
500	5.6	3.2	1.87	2.0	0.78	0.14
1000	20	6.4	7.7	4.1	2.8	2.8

On a test made on a cast-iron, bell and spigot joint, pipe line 11,790 ft. long, as shown on the accompanying



Profile of Line Tested

sketch, with water flowing through main and service pipes, the following observations were made by means of a pressure gage:

At point marked *A* the gage registered from 14 to 40 lb. pressure per sq.in., the water in the pipe being in motion when the gage was read:

Elevation of reservoir was..	1260.8
Elevation at gage was.....	1134.8
Calculated	126.0 = head × 0.434 = 54.68 lb.

It was calculated that when the pipe was passing 950 gal. per min. at the gage, that it should register 16.77 lb. pressure per sq.in. The loss of head in feet (due to friction in pipe) per 1000 ft. when delivering 950 gal. per min. was computed as follows: 12-in. pipe, 2.55 ft.; 10-in. pipe, 6.1 ft.; 8-in. pipe, 18.4 ft.; 6-in. pipe, 72.0 ft. On this basis the respective losses (see sketch) were: 700 ft. of 12-in. pipe = 1.78 ft.; 9700 ft. of 10-in. pipe = 60.17 ft., and 1380 ft. of 8-in. pipe = 25.39 ft., making a total of 87.34 ft. With a total head of 126 ft. and a friction loss of 87.34 ft., the effective head works out 16.77 lb. when the pipe was delivering 950 gal. per min.

TABLE SHOWING COST OF LAYING SPIRAL RIVETTED GALVANIZED PIPE, WITH BOLTED JOINTS, COMPLETE, 1913

Diam. of Pipe (In.)	Wire Gauge	Cost per Lin.Ft. Small Orders[1]	Large Orders[2]	Laid on Surface
4	18	$0.30	$0.26	$0.30
6	16	0.49	0.43	0.49
8	16	0.65	0.57	0.63
10	14	0.96	0.84	0.91
14	14	1.38	1.21	1.28
18	12	2.26	2.00	2.08
20	12	2.48	2.18	2.27
24	12	2.93	2.58	2.68

[1]Involving less than $250. [2] In large quantities at which discounts of 12% are obtainable.

As the quantity of water delivered in the pipe was checked by less water being consumed, the pressure increased, as registered on the pressure gage, and when consumption was lowest, gage registered 40 lb. pressure per sq.in. By making this a 12-in. line, the entire length, the loss of head due to friction would have been 30 ft., and the pressure at the gage would have registered 41 lb. per sq.in. when delivering 950 gal. per min.

The accompanying record on a recording gage, as used by the Panther Valley Water Co., shows the pressure per square inch for every minute of the day. It will be noted that at 5 a.m., with practically no water being used, gage registered 90 lb. pressure; at about 5:15 a.m., when the early morning domestic consumption began, the pressure dropped to about 80 lb. Between 7 and 7:45 a.m., with full consumption of water being drawn in practically every dwelling, the gage dropped to about 75 lb. and held at that until about 9 a.m., when the demand commenced to decrease, and from then on the gage shows the pressure to have increased rapidly to 90 lb. and remained there until 5:15 a.m., proving that the greater the consumption the lower the pressure.

The elevation of the reservoir is 1260.8 and the elevation at the gage is 1015.0, a difference of 245.8 ft., equal to a pressure of 106.67 lb. per sq.in. From the above it can be determined, if the information is carefully considered, what size and type of pipe should be used to best advantage for different pump or gravity conditions, and the tables showing cost of pipe per foot will be of value.

Montana Breaks Coal Record

The production of coal in Montana in 1913, was, according to E. W. Parker, of the U. S. Geological Survey, 3,246,973 short tons, valued at $5,653,539, being the record figures for the industry in the state.

The influences which have affected the coal-mining industry in Montana during the past year were first an influx of settlers into the state which resulted in an increased demand for domestic coal, second, a decreased consumption by the railroads because of the increasing use of oil, and third, extensive hydro-electric development to supply light and power to many cities, also to mining plants and manufacturing establishments.

The second and third influences named have naturally resulted in a decreased demand for steam coal, but the larger demand for domestic fuel more than outweighed the two adverse influences combined, and the production of 1913 showed an increase over the preceding year of 192,478 short tons, or 6.3 per cent. in quantity, and of $95,344, or 1.7 per cent. in value. As in each of the four preceding years, the output for 1913 was the maximum yet attained.

There were no serious interruptions to mining operation in 1913 on account of labor trouble. The number of men employed in the coal mines of the state was 3640, working an average of 228 days, against 3440 men on an average of 220 days during the preceding year.

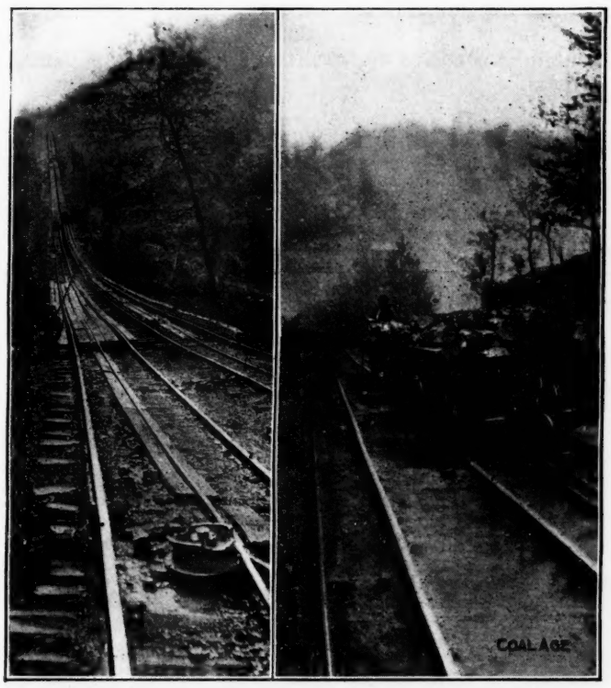
The mine workers of Montana have a good record for efficiency, and in 1912, the state showed the best average production per man per day among all of the coal-producing states. In 1913, the average production per man for the year exceeded that of 1912, 893 tons against 886 tons, but the average daily output by each employee decreased from 4.03 to 3.92 tons. The fatality record maintained by the Bureau of Mines shows an unfortunate increase from the low point of 7 in 1912 to 20 in 1913.

An Endless-Rope System for an Inclined Plane

By A. D. McFarlane*

SYNOPSIS—A long and steep plane is operated by an endless-rope system and carries a fair tonnage at an expense of a little over 3c. per ton, seven men being employed in its operation.

West Virginia produced 59,581,774 tons of 2240 lb. of coal in the year ending June 30, 1912; of this at least 27 per cent., or 16,335,247 tons, had to be lowered from the mine to the tipple by some system of haulage or conveyance. This was accomplished by various means which may be divided into two general classes. The first may be taken to include all systems in which mechanical power was required, the second those in which the force or power of gravity developed by the descending load was utilized to return the ascending load to the mine level. It is not the purpose of this paper to compare the merits and defects of the various systems, but to describe a system of the second class as used by the LaFollette Coal, Iron & Ry. Co., at their Gem mine, in Campbell County, Tennessee. The system used may be described as an endless-rope gravity plane because the loaded cars in descending pull the empty cars back by means of an endless rope.

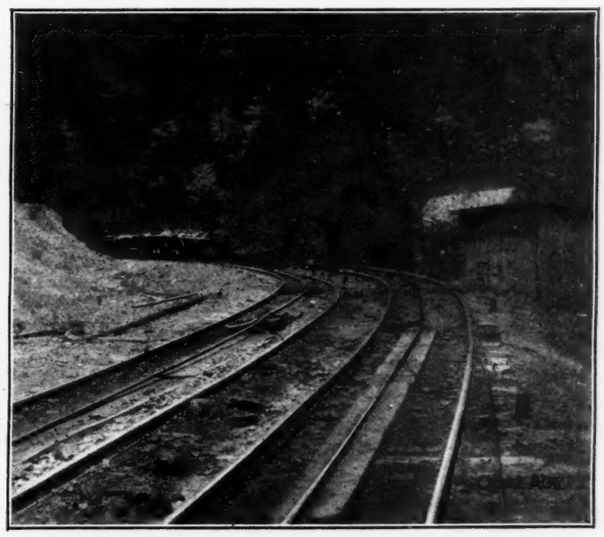


View of Incline Loaded and Empty Trips

The Gem mine is situated on a branch of the Louisville & Nashville Ry. and is working the Jordan seam, with an average elevation of 1986 ft. above sea level. The railroad in the valley is 1340 ft. above tide level, so that all coal shipped has to be lowered a vertical distance of 613 ft. to the tipple floor. The horizontal distance between the knuckle and the tipple is 3640 ft., and the length of the plane is 3700 ft. and its average inclination is 16.8 per cent. The plane starts from the knuckle with a 19.8 per cent. grade; this runs for 750 ft. and then increases to 28.4 per cent. for 600 ft., after which it decreases to 18.8 per cent. for a distance of 300 ft.; from this point the grade gradually decreases until it ends at the tipple with a 3.3 per cent. grade.

The Plane

The plane is laid with 30-lb. rails, two tracks of 36-in. gage on 6-ft. centers. One track is used by the descending loads while the other is used by the ascending empties. Cast-iron rollers, 6 in. in diameter and 6 in. wide, with chilled surfaces, are placed in the center of each track on 50-ft. centers. A 10-in. board is spiked to the ties, which are placed on 20-in. centers. The board keeps the rope from dragging on the ground. Owing to the topography, it was deemed advisable to place two curves in the plane, one near the top which is on an inclination of 20 per cent., while the other near the bottom is on a 3 per cent. grade. On the curves the outer rail is elevated and sheaves are placed 20 ft. apart to deflect the rope.



Going around a Sharp Curve

The Rope

The rope in use is of plow steel, 1⅛ in. diameter and composed of 6 strands of 19 wires each wrapped around a hemp center. It has a rated breaking stress of 55 tons per sq.in. The rope runs down the center of one track, around a sheave wheel, placed on a tension carriage running underneath the tipple floor, then up the center of

* Chief engineer LaFollette Coal, Iron & Ry. Co., Box 334, LaFollette, Tenn.

Note—Article read before the West Virginia Coal Mining Institute at Cumberland, Md., June 3, 1914.

the second track to the drums, which are beneath the floor of the head house, then four times around the drums to the center of the first track.

The Tension Carriage

The tension carriage is made from a standard freight-car truck. Upon this truck is mounted an iron sheave wheel 6 ft. in diameter with a $4\frac{5}{16}$-in. shaft. This truck rolls on 30-lb. rails set on an angle of 35 deg. to the horizontal and is loaded with scrap until it weighs three tons. Its distance of travel scarcely exceeds 3 in. except in a wreck, then the travel is violent and long.

The Drums and Brake

At the head of the plane are two cast-iron drums, 6 ft. in diameter and 4 ft. high, set vertically on 10-ft. centers with their line of centers parallel to the plane and grooved to receive the rope. These drums are controlled by an ordinary friction-band brake, suitably counterweighted so that the brake is set, except when held released by the drumman. This brake is connected by a ½-in. chain to a handwheel, such as is used on freight cars. This wheel is set to one side so as to be out of the way of the cars, but sufficiently close enough that the drumman can see the headmen attach and detach the trips.

Method of Operation

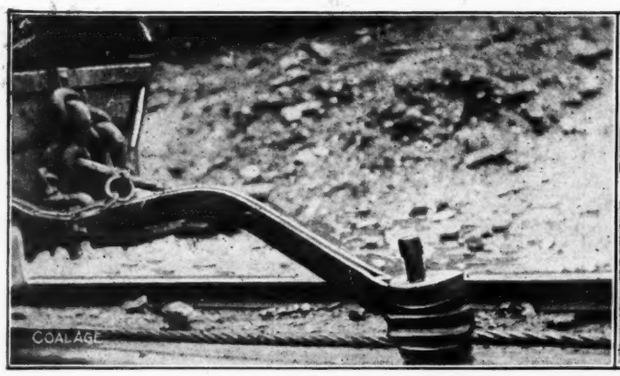
The mine cars are pushed into the head house by the mine motor and made up into trips of 5 cars coupled together by the regular mine-car couplings; to the rear drawbar of the last car a special grip is attached, which is fastened to the rope by tightening a setscrew. While the loaded trip is being attached to the rope, an empty trip has been detached on the adjacent track; at the same time the couplers in the tipple have detached a loaded and attached an empty trip. When the couplers in the tipple have everything in readiness, they signal to the drumman, either by an electric bell or telephone; he then looks to the couplers on the head for the signal, and if they are ready, he tightens his wheel, thereby raising the counterweight, loosening the brake, which releases the drums and allows the loaded trip to descend and an empty trip to ascend to the proper point in the head house.

When this point is reached, the brake is tightened, the rope stopped and an empty and loaded trip detached and attached as before. In the meantime, the first trip has descended approximately 700 ft. This operation is repeated until 5 loaded trips are on the rope; as the sixth is being attached, the first is being detached on the tipple. The tipple is equipped with a Phillips cross-over dump, necessitating the empty track being some 4 ft. lower than the loaded at the point where the trips are attached and detached. With this difference in elevation and the grade of the tracks being opposite in direction, the important point in landing the trips is to stop the empty trip at the proper point in the head house. This being directly under the eye of the drumman, little trouble is experienced on this score.

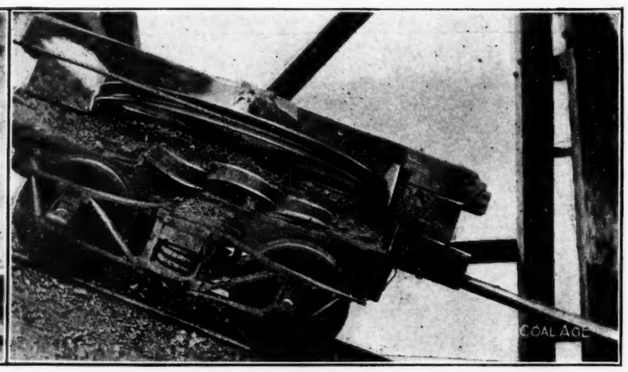
There is surprisingly little difference in the spacing of the trips, and it is seldom they have to be respaced. There is no physical or mechanical difficulty in increasing the number of cars per trip or the number of trips suspended on the rope, but in designing such an installation, it must be borne in mind that the rope distance between the attaching and detaching points in the head house and tipple must be the same, and that this distance will govern the spacing of the trips. In this particular installation there are 6 trips of loads and 6 trips of empties on the plane at one time, counting the trips at the head and at the tipple; so that the distance between trip centers is equal to one-twelfth of the total rope length.

The Grip

By referring to the accompanying drawing, it will be seen that the grip is composed of two parts, the arm and head held together by a ⅞-in. rivet. The arm is made from machine steel 2½x⅝ in. thick, doubled back and riveted by ⅝-in. rivets, forming an arm 1¼x2½ in. The upper end of the arm is rounded out to receive the 1⅛-in. clevis pin of the car coupling; the lower end is flared out in the form of a yoke to receive the head. The arm is bent vertically to compensate for the difference in height of the drawbar and rope. The head is made of three parts, one of which is a standard setscrew, 1½x4½ in.



Showing Type of Grip Used



View of Tension Carriage

The grip block is made from a piece of steel 2x2¼x6 in., forged as shown and drilled to receive the point of the setscrew. The bottom and outside are grooved—the bottom to receive the rope and the side to clear the flange of the curve sheaves. The jaw is forged from a piece of steel 4x4¼x6 in., recessed as shown to receive the rope and drilled and threaded for the setscrew. Both the grip block and the jaw are turned in the form of an arc, so that when the setscrew is tightened the rope is crimped, thereby preventing any slippage. The crimping being only ⅛ in. does not injure the rope. The grips weigh about 50 lb. each and their maintenance is almost

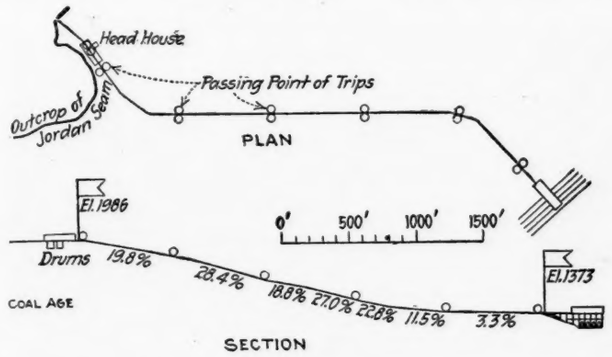
negligible. To attach or detach one takes considerably less than a minute.

Labor Required

Seven men are required to operate the plane. The drumman operates the drum and has supervision over the head. Two couplers in the head house and two on the tipple attach and detach the trips. A man is stationed where the loaded trips first stop, and at this point there is a derailing switch which can be thrown in case of a wreck or runaway on the track above. The planeman is furnished with a wrench, and tests the grips and oils the outer wheels of the descending trips. At the first stop of the ascending trip another oiler is placed; he oils the outer wheels of the ascending trips. Both of these planemen are stationed so that they command a view of the upper and lower curves respectively, and at each station is placed a switch, which, when thrown, flashes an electric light in the head house. In case of a wreck or accident, the switch is thrown, warning the drumman, who immediately stops the rope.

Cost of Operation and Maintenance

Two years ago the present rope was installed and cost in place $2000. A new rope, recently ordered for installation during the summer, will cost much less. In 1913, 140,497 tons of coal were lowered down this plane in 268 days of 9 hours each, or an average of 524 tons per



Plan and Elevation of Inclined Plane

day. The maximum tonnage handled in one day was 885 tons in 8½ hours, which is at the rate of 104 tons per hour.

Taking the life of the rope at two years, which has been proved by past experience to be the average, the depreciation of the rope amounts to $\frac{7}{10}$c. for each ton of coal handled. The wages of the 7 men employed aggregate $11.83 per day, or 2¼c. per ton; this also includes the labor of oiling the mine cars. The cost of maintenance and renewal of ties, rollers, sheaves, grips, etc., averaged over a period of months is approximately $25 per month, or $\frac{2}{10}$c. per ton of coal handled. This includes cleaning up wrecks, replacing derailed cars, etc. There is an average of one wreck per month, which takes two hours to clean up. Most of the wrecks occur on the curves. The total cost of running and maintaining the plane per ton of coal handled is:

	Cents Per Ton
Depreciation of rope	$0.70
Labor	2.25
Maintenance	0.20
Total cost	$3.15

Strength of Rope

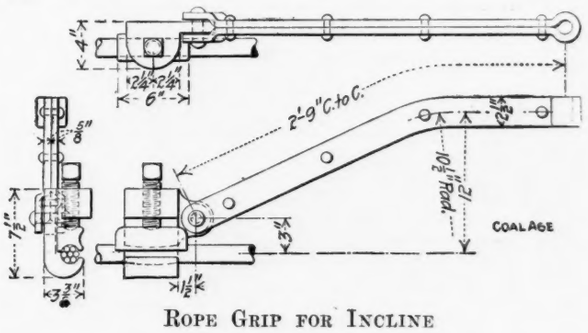
The tension on the rope can be calculated in a simple manner by assuming it to be stationary and composed of two independent ropes suspended at the top of the drums. Then the point of maximum strain will occur where the rope supporting the loaded trips first comes in contact with the drums and the strain at this point will be the greatest just as the loaded trip has cleared the knuckle, and the rope is supporting 25 loaded mine cars plus the length of one rope from the drum to the tension carriage plus half the pull of the tension carriage. The other rope will be sustaining the same weight less the actual weight of the coal in the mine cars. The empty cars weigh 1200 lb. and the loaded 4000 lb., so that the total movable weight on the loaded side that the drum supports is:

	lb.
25 loaded cars @ 4000 lb. each	100,000
½ weight of tension carriage—6000 lb.	3,000
4000 ft. of rope @ 2 lb. per ft.	8,000
Total	111,000

The average inclination of the trips at that point where the tension on the drum is greatest is 18.8 per cent., or 10 deg. 39 min. The tension T on the rope due to the loaded trip is:

$T = W (\sin a - \cos a \times Z)$ where
W is the weight of the loaded trip, 100,000 lb.
a is the angle of the plane, 10 deg. 39 min.
Z is the coefficient of friction equal to 1/20.

Substituting the above values in the formula and solving for T, we find that the tension on the rope due to the loaded trip is 13,568 lb. Morin gives the coefficient



Rope Grip for Incline

of friction of metal on oak as ½. Using this coefficient and W, the weight of the rope as 8000 lb., in the above formula, it can be shown that the dragging of the rope acts as a brake to the extent of 2453 lb. In the same way, it can be shown that the pull exerted by the tension carriage amounts of 1598 lb. The total tension on the loaded rope at its point of contact with the drum will be 13,568 plus 1598 minus 2453, or 12,713 lb., or 6.4 tons. which gives a factor of safety of 8.6 for the rated breaking strength is 55 tons per square inch.

The advantages claimed for this system are the low cost of installation, cheapness of maintenance, large capacity with minimum breakage of coal.

There was a fire at the Bold collieries in Lancashire. After the fire the pit was stopped three days, and the government inspector and everybody made as thorough an investigation as possible in the hope of finding out the real cause. There was a large stack of timber at the place,, and also a built chock of timber to support the roof at the top of a brow. It was there that the fire originated, and the only conclusion they could come to was that someone had hidden some matches there, and the weight had come down and set them off.

Engineering Practice of the Consolidation Coal Co.--Office Methods

By A. W. Hesse*

SYNOPSIS—A description of the office methods of the Consolidation Co. The work is subdivided along very comprehensive lines as is necessary in a large organization of this character. Elaborate blueprinting and photo-reduction apparatus are part of the equipment. Unusually thorough methods of preserving and filing office records are used.

In the engineering department of the West Virginia Division, the Consolidation Coal Co., there are employed forty persons, most of whom are assigned to the six divisions comprising this department. Four divisions handle the work connected with the mines and the respective allotted territories, the outside division being given general and miscellaneous work, while the sixth division or drafting department handles special drafting and photographic work.

To each division is apportioned separate office space, so that its particular work will not become confused with that of some other section. Tables, instruments, calculation books, traverse and acreage sheets are all arranged so that no division interferes with the other in its work; and calculations, traversing, map work, tracing and miscellaneous duties are performed by the parties forming this division.

The office work, or what may be termed as such, of this department, may be classified under the following headings:

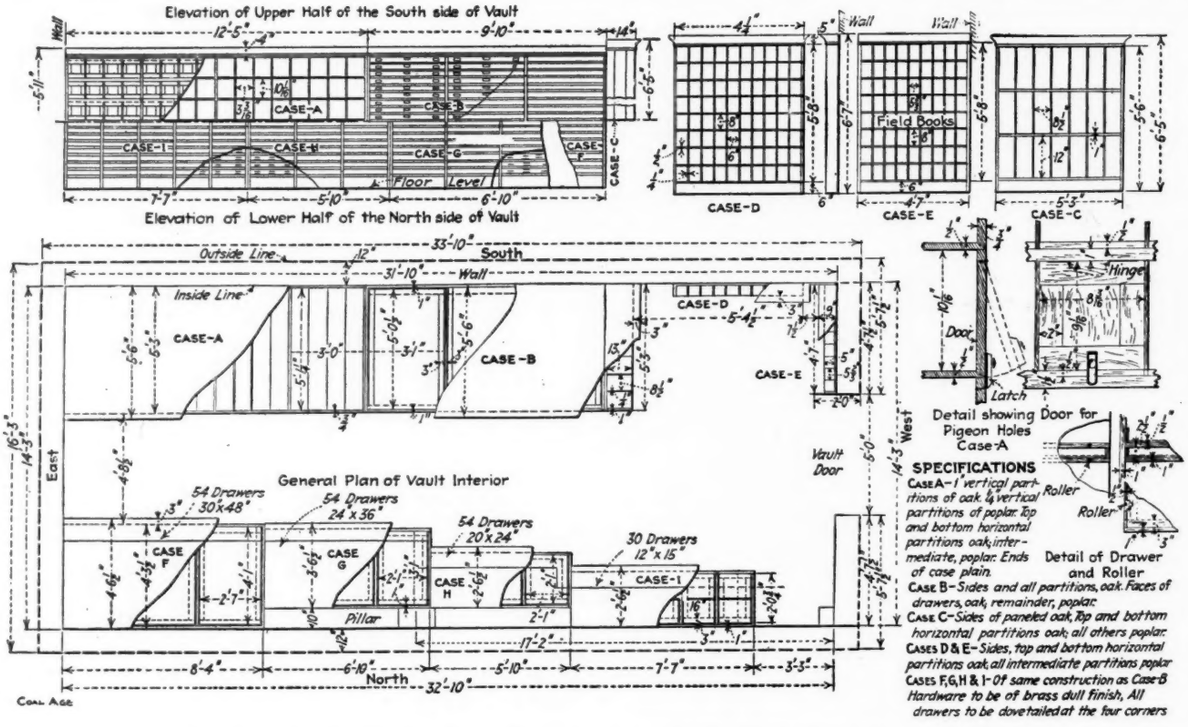
First—Computations.
Second—Mapping and Tracings.
Third—General Drafting and Indexing.
Fourth—Photographing and Printing.
Fifth—Miscellaneous.

Computations

In all the surveys (as previously explained in Coal Age) there are horizontal distances, latitude and longitude differences to calculate, and the traverse sheets to make up. If a property has been surveyed, or an outside boundary line located, this being done by locating the corners of the property from survey lines not co-inciding with the boundaries of the property, coördinate values must first be obtained of the property corners and the courses and distances between these corners calculated.

It is a rule of the department that all property corners along the outside boundary of our properties, or of special importance, must each be located from two stations of the random survey to avoid error in location. After all the available courses and distances are calculated between the known or located corners, they are compared with the deed of that property and an average of the differences taken for a correction on the remainder of the calls requiring traversing. The traverse is then made between located corners with the corrected calls.

But discrepancies usually exist in the total latitude and total longitude differences, known as errors of closure. These are distributed among the latitude and long-



Plan, Elevation and Details of the Consolidation Co.'s Main Vault

*Assistant chief engineer, Consolidation Coal Co., Fairmount, W. Va.

itude differences in proportion to their lengths. Then from the adjusted latitude and longitude differences, new courses and distances are calculated between the unlocated corners. After these new coördinates are obtained, attempts have been made, and sometimes with success, to find the corner in the field by calculating a course and distance from survey stations to these calculated corners. The property sheet herewith illustrates my explanation.

After all the courses and distances have been established beyond any reasonable doubt, they are placed on acreage sheets, also shown herewith, and the acreage calculated by the double-longitude method.

Mapping and Tracing

Maps covering mine work and allotted territory are made by the same parties having charge of the survey of these mines. The map paper used is the rough, thick mounted "Paragon" paper of 58-in. width. It is usually bought in rolls of ten yards and cut off as required.

Before working on this paper, after a map size is decided upon, the piece is stretched out upon a table for several days, or longer if necessary, in order that it may be properly seasoned before the coördinate lines are blocked out. Also, when a certain territory is allotted to a new mine, before the lines are blocked out on the map, the coördinate values are obtained upon the extreme corners of the boundary in order to determine just which direction across the map to draw the first line.

This line is usually the longest on the map, and points are marked off corresponding to 1000 ft. (on the 100 ft. to the inch maps). After this is done, a beam compass is used to get perpendiculars to this line by the intersection method. Having drawn the perpendiculars, these likewise are marked off in 1000-ft. spaces and the block completed by drawing lines across these points. A 6-ft. beveled-steel straight-edge is used in this work, the lines being first put on in pencil and blocks carefully checked before finally established with drawing ink.

All survey stations are then plotted on from their coordinate values; the 18- or 24-in. parallel rule on rollers and the engineer's scale, graduated to fiftieths, being used in this work; these locations are verified by plotting or checking the course by protractor and measuring the distance between each pair of stations.

The blueprint tracings and the working tracings, from which acreages are calculated, are made from these maps by the members of the division to which these mines are assigned. Worked-out acreages and theoretical tonnages are likewise calculated by the respective parties.

General Drafting and Indexing

The drafting room is equipped with four 5x10-ft. drafting tables, which are so placed as to allow for a 3½-ft. passageway around the entire table, affording the draftsman free access to his work from all sides.

These tables are placed on two cabinets and substantially bracketed to them to insure rigidity. The cabinets are equipped with three sections of drawers, those in one cabinet being full length and half-length drawers in the other. The upper half-length drawers are fitted with locks, in which are kept the supplies and instruments of the draftsman. This same class of table is also installed in each division office.

The drafting room is 16x50 ft. in size, lighted by six

THE CONSOLIDATION COAL COMPANY—West Virginia Division. ENGINEERING DEPARTMENT—PROPERTY SHEET No. 18

Incorporated

John Rogers Tract. 10 Deed Acreage Mine No. 99 Property Jno. Rogers Deed No. 128 D. B. 76 Page 104

Note—Values indicated by *b* are calculated from actual location; Values indicated by *a* are calculated from adjusted deed courses; Values indicated by *c* equal *a* values balanced; Values indicated by *d* are adjusted to agree with adjoining property.

Deed										Calculated															
		Distance				Calculation Books						Lat. Difference		Dep. Difference								Traverse		
Corner	Quadrant	Poles	Feet	Corner	Remarks	Volume	Page	Corner	Quadrant	Hor. Distance		North	South	East	West	Total Latitude	Total Departure	Corner	Folio	Sheet	Remarks
										Correction +	2°08 on S.	E. & N.	W.:—Used + 2°01								
*	N80°30W	56	924.00	.....	*At a ravine back of Rogers House To Jones Tract	125	76		c N82°37W	c 943.70		c 121.38			c 935.91	c S 566.94	c E 140.21				
									a N82°31W	a 924.00		a 120.34			a 916.13	a S 570.68	a E 140.86				
..	S 6° E	15	247.50	W. O.		125	77		c S7°55E	c 245.30			c 242.96	c 33.76		c 445.56	c W 795.70				
									a S 8°01E	a 247.50			a 245.08	a 34.52		a 450.34	a W 775.27	W.O., Tie			
W. O.	S75° W	30¼	503.30	Stake		125	77	W. O.	d S73°10W	d 497.50			d 144.17		d 476.51	a 695.42	a W 740.75	+6.90, —			
									b S73°35W	b 498.78			b 141.00		b 478.43	b 688.52	b W 761.94	21.19	26	78	Cor. to Jones
Stake	S80°30E	83	1369.50	Stake		125	77	Stake	d S82°38E	d 1360.20			d 174.23	d 1348.93		d 832.69	d 1238.45	Use			
									b S82°31E	b 1362.45			b 177.40	b 1350.85		b 829.52	b W1240.37	Stake	26	78	3' up hill from a Linn
Stake	N 6° E	26¼	437.30	Beginning		125	78	Stake	c N 3°52E	c 441.00		c 439.98		c 29.73		b S1006.92	b E 110.48	Post	26	78	
									a N 3°59E	a 437.30		a 436.24		a 30.38		c 566.94	c E 140.21				
																a S 570.68	a E 140.86	Beginning			
																Note:—The errors of closure = +6.90 and —21.19 which are distributed over the Lat. Diff. and Dep. Diff, respectively, between the Post and W. O. which are located corners				
		Calculations by			and			Copied by				Checked by				Approved:					Division Engineer.				

44½-in. by 7-ft. 10-in. windows arranged in pairs, while over each table are suspended two 40-watt "Tungsten" electric lights, additional portable stands and bracket lights being used when necessary. Full drafting room equipment is provided for topographical, mechanical and architectural work, and for enlarging or reducing drawings to various scales by pantograph.

Indexing of all drawings is handled by the drafting division. The accompanying print shows the arrangement of filing cabinets in the vault, which is built on the department's floor especially for this purpose. The sets of drawers for tracings are designated as cabinets *A, B, C, D* and *E;* in size ranging from *A,* the smallest, to *E,* the largest. In each cabinet an individual system of numbering is maintained, each beginning with number one, and every tracing is classified as belonging to a particular cabinet file by the use of the cabinet letter as a prefix, as A-1461, for example. In numbering the drawers, the number of the last tracing filed therein is used instead of the first and last being indicated, as is usually done; thus, if 100 tracings were in the first drawer of a particular cabinet, the number of the plate card would be 100 and the second drawer card 200, instead of 1-100, and 101-200.

Form 263. 500. 7-1-12.

FAIRMONT COAL COMPANY. Engineering Department. ACREAGE SHEET No. 12

John Rogers Tract Mine No. 99 Property Jno. Rogers Deed No. 128

Property Sheet	Corner	Quadrant	Horizontal Distance	Lat. Dif. North	Lat. Dif. South	Dep. Dif. East	Dep. Dif. West	Double Longitudes	Double Areas North	Double Areas South	Total Latitude	Total Departure	Corner	Remarks
											S 566.94	E 140.21	.....	
18	..	N82°37W	943.70	121.38			935.91	— 935.91		113600.76	S 445.56	W795.70	.....	
	..	S 7°55E	245.30		242.96	33.76		—1838.06	446575.06		S 688.52	W761.94	W.O.	
	W.O.	S 73°10W	497.85		144.17		476.51	—2280.81	328824.38		S 832.69	W1238.45	Stake	
	Stake	S 82°38E	1330.20		174.23	1348.93		—1408.39	245383.79		S1006.92	E 110.48	Post	
	Post	N 3°52E	441.00	439.98		29.73		— 29.73		13080.61	S 566.94	E 140.21	Beginning	
				561.36	561.36	1412.42	1412.42		1020783.23	126681.37				
									126681.37					
									2) 894101.86					
								4356	0) 447050.93	(10.26 Acres				
									43560					
									114509					
									87120					
									273893					

Calculations by..... ....and..... Copied by..... ..... Checked by..... Approved: ..... Division Engineer

Indexing

There are only two standard sizes for drawings; correspondence, which is 8½x11 in., and legal, 8x13 in. It has not proven advisable to further standardize, either from necessity or economy; but when making new tracings or drawings they are sized to fit drawers which will best accommodate them. All tracings are filed flat except when so large there is danger of crushing, or when very long and narrow. In these cases they are rolled on sticks and placed in the drawers they fit the best.

Drawers of the depth shown on the accompanying drawing will accommodate from 100 to 300 tracings, depending on size and age. For keeping the tracings in position it has been found better to place a fairly wide board of light wood, such as boxwood, on top of the tracings rather than the usual covering of tin across the back portion of the drawer. It frequently happens that the tracings are both new and old and not all the same size and in this case they are liable to work out of position and become crushed and torn between the edge of the tin strip and drawer partition.

Two indexes are employed; the progressive index, in which the numbers of all tracings are entered in consecutive order as they are placed in the file, and the classified index which is referred to when a particular drawing is desired. The progressive index provides against the possible repetition of file numbers, and from it a new indexing system may be inaugurated at any time. The classified or reference index is arranged as follows:

Mines—Meaning mine numbers, under which sub-divisions are shown the various tracings of mine workings, properties, etc.

Alphabetical, which is virtually a general division according to the first letter of the principal word in the title.

Mining Plants, including all structures and equipment pertaining thereto.

Property, under which heading all property maps are included.

Profiles, of whatever nature.

Photograph, Working and Blueprint tracings, under which headings have been grouped these particular classes of drawings as they are of the most importance and frequently used.

In addition to this general outline, there are several miscellaneous divisions. The positions of the various mounted mine maps in the pigeonhole cabinet are indicated by cards bearing the mine numbers, these being placed on the drop doors and no further indexing being necessary.

Photography and Blueprinting

All this class of work is usually handled by the drafting department. At the end of the year, the mine working maps throughout the region are reduced from 100 ft. to 500 ft. to the inch by copy-process photography. These maps are then bound in folios for the various officials. In order to obtain uniformity, these tracings are brought up to date by the drafting department, and then photographed on 11x14-in. plates. In all, about 150 plates of this size are used throughout the year, from which about 3000 prints are made.

The studio room in which this work is done, is the largest of the three communicating rooms, reserved for photographic work, being 18x30 ft. in size, with an overhead skylight 9x17 ft. There are four large windows, arranged in pairs on either side of the room and in line with the skylight. Mercury vapor lights are used for artificial lighting.

Curtains are provided, properly fitted with rings, and so arranged that the overhead and side light can be controlled to the best advantage at any time of the day.

The arrangement of the photographic apparatus in this room is designed specially for copy-process work; the maximum limit of reduction by any one operation being 1 to 10.

The exposure board, upon which the tracings or print to be photographed is securely fastened by thumb-tacks, is 5x8 ft. in size, and constructed of the best grade of seasoned white pine. It is mounted on a special carriage by pivot supports, their position being such as to distribute the weight of the board enough past center to provide for either a horizontal or vertical stationary position as required.

A 11x14-in. camera, fitted with anastigmat lens, and mounted on a cabinet stand (used for supplies, loaded plates, holders, etc.), is moved to any desired distance from the exposure board upon a triangular shaped steel rail track, this being accomplished by means of a chain gear attachment to the stand operating on a milled third or center rail.

The sliding door between the studio and the enlarging or general supply room, is used as a support for the enlarging camera. An opening in the door panel, exactly fitting the enlarging camera box, is used for the transmission of artificial light, mercury vapor lights being generally used for this purpose. The exposure board for enlargements is 5 ft. 2 in. square, fitted in a stand 12 in. from the floor. The window in this room is fitted with orange-colored glass, and provided with inside shutters so that all light may be excluded when necessary. The enlarging room is 18x20 ft. in size, but a portion of this area is included in the dark room, entrance to this being directly from the enlarging or supply room.

There are two cabinets in the enlarging room, which are of special design and intended for the preservation of chemicals, negatives and various photographic apparatus. The first, or chemical and mixing cabinet, in addition to the uses implied by its name, is also used for the storing of plates, the lower portion of the case being adapted to this purpose. The second, or negative cabinet, is fitted with shelves which are properly partitioned to accommodate 6½x8½-in. and 11x14-in. negatives in the upper part, the lower being used for the storing of photographic apparatus pertaining to enlarging work.

The Blueprinting and Dark Rooms

The dark room is located on the northeastern corner of this floor, with the dark-room window facing the east. This window is fitted with sliding doors of full length, frosted orange and ruby glass, with wooden dark-room shutters on the inside, the interior of the dark room being painted dead black. This room has a concrete floor, printing box, properly fitted dark-room light-box, water filter, hinged wall drop-leaf table and a cabinet especially designed for the uses peculiar to dark-room work in the handling of negatives, storing of printing paper, trays, holders and the like; it is provided with a ventilator, dark or blind entrance, electric lights and is steam heated. Two 18x36-in. sinks, 6 in. deep, are supported by a built-in framework extending across the entire width of room on the east side, provided with proper draining and splashboard equipment, and located 3 ft. 4 in. above the floor. This room is 8 ft. 6 in. in width and 17 ft. long, including the blind entrance above mentioned. A shelf for the accommodation of the chemicals most frequently used in dark-room work, a developer cabinet beneath the developing table, for stock solutions, and a full line of graduates, trays, fixing and washing boxes, etc., constitute the equipment.

The blueprinting room is 24 ft. 10 in. wide and 38 ft. 8 in. long, lying in parallel to the photograph department rooms. There are four large windows fitted with orange glass for properly subdued light in addition to the electric lights which are used for direct lighting. A concrete floor 6 ft. in width extends from one end of the room along the side wall for a distance of 25 ft.

The washing tank is equipped with hot- and cold-water spigots, lined with copper, and is 5 ft. wide, 10 ft. long and 10 in. deep, allowing for 8 in. of water up to the overflow standpipe. A table 5x10 ft. in size is mounted on wooden horses, and fitted with a center drawer for keeping supplies.

The table for sizing the unexposed printing paper is 4 ft. 2 in. wide and 8 ft. long. It is also fitted with a center supply drawer, and is mounted on two cabinet stands. The interior of these stands is divided into compartments for storing sensitized printing paper of all kinds, in addition to which, metal tubes are secured to the edges of the table, in which an entire roll of paper may be placed and the amount desired for a print is measured and trimmed off automatically without danger of exposure during the process.

The blueprinting equipment consists of an electric cylindrical blueprinting machine accommodating tracings 42x72 in. in size, and two 36x60-in. sun frames. The latter are mounted on portable carriages and tracks so that the loaded frames may be moved out on the roof and exposed at any angle. Plate holders for making prints 6½x8½ in. and 11x14 in. are used when such prints are required.

In addition to the copy-process photographic work, there are numerous pictures taken of the various improvements about the mining plants throughout the year, comprising interior, landscape, commercial and flash-light photographic work. In this work a 6½x8½-in. plate is always used, and about 1000 prints of these negatives are required throughout the year.

An inspection of our blueprinting record for work done during the past year shows that 42,960 ft. of printing paper of various kinds was used, or about 8.1 miles.

Miscellaneous

Under this heading is included the compilation of the annual report, abstracting, complete file index record of deeds, agreements, etc., analysis of cost statements, and numerous odd jobs which are constantly arising.

Each year the various divisions, of which there are five, assemble the data of interest and importance on their division and forward it to the Fairmount office where it is compiled, pages properly numbered and indexed and bound in a volume as an annual report. Nineteen of these reports of 560 pages each were made up for the year 1913.

This department keeps copies of all the deeds, leases, agreements, etc., of the coal and surface conveyances, all of which are filed and indexed in this office, and maps made showing the various fields with the index numbers on the tracts included. Frequently abstracts are made of properties to show the exact condition of the title, to which are attached colored plates to assist the reader in following the conveyances.

The Kanawha Labor Agreement

SYNOPSIS—This wage agreement penalizes idleness in violation of the scale, provides for a nine-hour day, grants a check off, excludes certain employees from the union and requires that the workers during strikes shall perform all necessary work except the mining of coal for shipment.

This agreement was submitted to the miners and approved on July 15, 1914. It supersedes the tentative agreement of the operators and miners arising out of their combined acceptance of the second proposal of the commissioners of conciliation. Details regarding the history of the strike, the conciliation, the agreement and the area it affects can be found on pp. 973 and 975 in the previous volume and on pp. 21, 22, 69 and 113 of the present volume. The document has not been reproduced in its exact words, but it is believed that its meaning has not been changed nor have its provisions been in any way abridged in this reprint.

Articles of Agreement

Memorandum of agreement, made and entered into this 11th day of July, 1914, by and between the operators of the Kanawha District of West Virginia and the United Mine Workers of America, governing the operation of mines in the said district for the period ending Apr. 30, 1917.

The scale prices of the 1912-14 agreement are hereby reaffirmed with such additions as are recommended below and these additions are hereby made a part of the scale as follows:

It is agreed that the present prices paid for labor between the drift mouth and the mine tipple—that is to say men working in, on or around said tipple—shall constitute the scale of wages to be paid during the life of this contract.

Drawing pillars by pick in the gas seams shall be left to local adjustment by the operators and miners interested but the rate agreed upon for said drawing of pillars, shall in no case be less than 40c. per net ton. Drawing pillars by pick in the splint seams shall be left to local adjustment by the operators and miners interested but the rate agreed upon for said drawing of pillars, shall in no case be less than 46c. per net ton. No yardage is to be paid in air ways following entries and breakthroughs where the width exceeds 15 ft.

It is agreed that negotiations for a new contract shall commence 30 days prior to the expiration of this contract.

It is further agreed that if at the end of 30 days after the expiration of this contract, a completed contract has not been agreed to, that the disputed point shall be submitted to the scale committee of the operators' association and an equal number of miners; which committee and miners so selected shall decide the matters in dispute within 30 days from the time of submission and in the event that either the miners or operators are not satisfied with the decision rendered they or either of them have the right to revoke the same. It is expressly understood and agreed that during all such negotiations the mine workers shall continue at work and the new contract shall be retro-active to the expiration of this contract.

The rules as amended and the scale with the changes named above are hereby made a part of this agreement.

Rules

CHECK-OFF

There shall be a check-off for dues and assessments only, not exceeding $1.10 per month or 55c. per pay collected by the coal companies which are parties hereto, from those for whom the scale is made. This check-off shall be collected only on the voluntary individual order of the person from whose pay it is deducted and shall be subject to revocation by those who no longer wish to pay the same; such order or orders of revocation with list of same must be in the companies' hands 24 hr. prior to the expiration of each half month.

(a) All assessments must be levied by the national or district organization of the United Mine Workers of America.

(b) The check-off herein provided shall be collected after store, house rent and smithing charges have been paid.

(c) Only moral suasion shall be permitted in influencing men to pay dues or to join the union.

(d) The form signed by each person desiring collections made shall be as follows:

To.....Co.:

Please pay to the authorized agent of Local Union No. .... of the United Mine Workers of America, the sum of 55c. each two weeks out of my earnings or $1.10 for each month while in your employ until this order is revoked. The money thus collected is to serve as dues and assessments to the United Mine Workers of America.

.....

Dated .....

Witness.....

MACHINE WORK

2. The price paid for loading coal after machines in narrow work, by the ton, shall be, if the operator so desire, the same as in wide work; the excess price now paid for loading to be paid on a yardage basis according to the number of tons of coal produced in each yard of narrow work.

3. Machine men will be required to cut coal level and close to the bottom, and all machine men leaving more bottom than 4 in., except in case of pots or extreme variations of level, will be required to lift same or it shall be lifted at their expense.

4. In case sprags are left by the machine men, the latter shall be notified by the loader, and if they refuse to remove same, the loader shall do so and be allowed 50c. for so doing; the said 50c. shall be charged to the machine men.

5. All machine loaders shall be awarded two rooms, or the equivalent of three rooms in thin seams, for each two men, and they shall work as "buddies," and in that way load from one room at a time, so that it will give an opportunity to cut the other room, and so that no time will be lost by machine or loaders. The operator will provide such rooms for each two men at the earliest possible moment, but in the event of territory becoming scarce from a squeeze or when striking a horse-back, or any other unavoidable obstacle, this clause shall not be construed so as to diminish the output of the mine.

CHECK-WEIGHMAN

6. Check-weighmen, selected as required by law from among the employees at any mine, may be placed on each tipple at the expense of the miners, and their duties shall be only those prescribed by the laws of the State of West Virginia, and all weigh scales may be tested by the miners at any reasonable time. In case a suitable man cannot be found at any mine an outsider may be employed by and with the mutual consent of the operator and his miners.

TRADE

7. Employees have the right to trade where they please.

RUN-OF-MINE OR SCREENED-COAL BASIS

8. The mining rate per ton for splint or hard coal shall be fixed upon a run-of-mine basis, but screened-lump coal may be mined provided the increased rate paid for screened-lump coal shall be according to the percentage of screenings in producing screened-lump as against mine-run coal.

HIRE AND DISCHARGE

9. The operator or his superintendent or mine boss shall be respected in the management of the mines and the direction of the working force. The authority to hire and discharge shall be vested in the mine superintendent or mine boss, and nothing in this agreement shall be construed to abridge the rights of the employer in either of these respects.

LOADING CARS OR BARGES

10. The operator shall at all times be at liberty to load with coal any railroad cars or barges whatsoever, regardless of their ownership, and sell and deliver such coal in any market, and to any person, firm or corporation that he may desire.

NINE HOUR DAY

11. Nine hours shall constitute a day's work: 9-hr. day means 9 hours work at the face, exclusive of noon-time, 6 days or 54 hr. a week, provided the operator desires to work the mines, and no local ruling shall in any way affect this rule or impose conditions affecting the same, and any class of day labor may be paid, at the option of the operator,

for the number of hours or fraction thereof actually worked at the hour rate, based on one-ninth of the scale rate per day, except that when the day men go to the mine in the morning, they shall be entitled to two hours work whether the mine works two hours or not, provided that the failure to operate the mine is not the result of men being out or declining to work. If for any reason the regular routine work cannot be furnished to the inside day labor for any portion of the first two hours, the operator may furnish other than regular labor for the unexpired time.

12. All classes of labor are to work full 9 hr., and going to and coming from their respective working places is to be done on their own time. All day men shall perform whatever day labor, the foreman may direct, and a nine-hour day means 9 hr. work in the mine at the usual working places, exclusive of the time required in reaching said working places in the morning and departing from the same at night.

Drivers shall take their mules to and from the stables and the time required in so doing does not include any part of the day's labor, their time beginning when they reach the change where they receive empty cars and ending at the same place. The prevailing customs relative to harnessing and unharnessing their mules shall continue.

SEMI-MONTHLY PAY

13. All labor shall be paid semi-monthly. Semi-monthly pay means that the miners shall be paid twice a month, pay days to be determined locally, and statements shall be available 24 hr. prior to pay day.

MINING—WORKMANLIKE METHODS—TIMBERING

14. The miner shall be required to load his coal in every case free from slate, bone, nigger-head and other impurities.

15. All coal must be mined, drilled and blasted by the miners in a practical and workmanlike manner and in accordance with the state mining laws of West Virginia.

16. In paying for coal before it is screened, it is not intended to encourage unworkmanlike methods of mining and blasting coal, or to decrease the proportion of screened lump, and any miner will be subjected to discipline who, from ignorance, carelessness, or any other cause, fails to mine, shoot and load the coal properly.

17. The scale of prices agreed on for mining coal shall include the work required to mine, shoot, clean and load the coal, and timber the working places in the mines properly, and the operator shall be required to furnish the necessary props and timber to timber all working places properly.

18. If any miner shall fail to timber properly and care for his working place, and such failure shall entail falls of slate, rock and the like, or if, by improper and reckless shooting of the coal in room or entry, the mine props or other timbers shall be disturbed, or unnecessary falls result, the miner whose fault is the occasion of such damage, shall repair the damage without compensation, and if such miner fails to repair such damage, it shall be considered a dischargeable offense, and he may be dealt with at the discretion of the superintendent.

19. In any case where the mine boss directs the placing of crossbars to secure the roadway, then and in such cases only, the miner shall be paid prices for such cross bars as may be agreed upon between him and the mine boss. In case of miners shooting bottom, should any of the props be loosened or displaced, thereby endangering the safety of the workmen, the miner agrees to reset same. The above does not contemplate any changes from the ordinary method of timbering by the miner for his own safety.

DOCKS

20. In case any slate, bone, sulphur or other impurities are sent out by the miner, it shall be the duty of the trimmer of the car to call the attention of the weighman, and checkweighman where one is employed, to the same, so as to deduct the weight of such impurities as estimated by the trimmer or dock boss from the ascertained weight of such car; for the second offense he may be suspended for one working day or fined 50c.; for the third and each subsequent offense occurring in any one calendar month, he may be suspended, discharged or fined $1 at the option of the superintendent. In malicious and aggravated cases, the superintendent shall have the right to suspend or discharge for the first or any subsequent offense.

21. Any miner abusing, or seeking to embarrass the trimmer from performing his duties shall be fined $3, or be discharged at the option of the superintendent.

22. It is understood that if the checkweighman leaves his post to investigate the amount of impurities thrown out, or for any other purposes, the running of the coal over the tipple will not be suspended during his absence.

23. Splint coal loaded out with gas coal, when it is ordered to be separated, shall be considered as impurities and shall be dealt with as such.

24. The proceeds of all fines arising under this clause to be paid into the funeral fund. Under no circumstances shall the fines be remitted or refunded.

MINE COMMITTEE—GRIEVANCES

25. The duties of the mine committee shall be confined to the adjustment of disputes that the mine boss and miner, or miners, have endeavored but are unable to adjust.

The mine committee shall have no other authority nor exercise any other control, nor in any way interfere with the operation of the mine, and for violation of this clause the committee or any member thereof may be discharged.

25-a. In case of any local trouble arising at any mine, the aggrieved party shall first make an earnest effort to adjust the dispute with the mine foreman. In case they are unable to agree, the matter shall be referred to the mine committee and the local management of the mine, and if they fail to agree, to the commissioners of the miners and operators' association, and if they fail to agree, to the district board of the two organizations, and should they fail to agree, they shall select an umpire or referee, and the decision of a majority of them shall constitute a final and binding award. In all such cases all parties involved must continue at work pending the investigation and adjustment as above set forth.

25-b. If any employee for whom the scale is made refuses to work because of any grievance which has not been taken up in the manner provided herein and such action shall seem likely to impede the operation of the mines, such employees or any of them will subject themselves to dismissal without recourse at the option of the company, and the mine committee shall immediately furnish a man or men to take such place or places at the scale rate in order that the mines shall continue at work, and it shall be the duty of any member or members of the mine workers who may be called upon by the mine boss or mine committee to take immediately the place or places assigned him or them in pursuance hereof.

25c. The mine committee shall under no circumstances go around the mine for any cause whatsoever unless called upon by the mine boss or by the miner or day man who may have a grievance that he cannot settle with the mine boss and then only to investigate that grievance with the parties involved.

25-d. Members of mine committee employed as day men shall not leave their places of duty during working hours except with the permission of the mine boss or in cases involving the stopping of the mine.

25-e. Any employee or employees guilty of throwing the mine idle or of materially reducing the output of the mine by failing to continue at work in accordance with the provisions of this agreement, for the purpose of enforcing some demand in violation of this agreement or to force a decision of some case in dispute by methods other than as provided for herein shall be fined $1 each for each day so idle. All fines collected as above shall be paid to the treasurer of the Kanawha Coal Operators Association; such fines to be distributed from time to time for charitable purposes by the presidents of the two organizations, and under no circumstances shall any fines so collected be refunded except when mutually agreed to by the two organizations.

NEGOTIATIONS DURING SUSPENSIONS

26. Under no circumstances will the operator recognize or treat with any representative of the United Mine Workers of America during the suspension of work contrary to this agreement.

WORKING IRREGULARLY

27. Should any employee absent himself from his work for two days or persist in working irregularly, unless through sickness, or by first having notified the mine boss and obtained his consent, it shall be construed as a dischargeable offense; and in case of sickness it is the duty of said employee to notify the mine boss at once in order that arrangements may be made to fill his place.

TURN

28. The operator will see that an equal turn is offered each miner, and that he is given a fair chance to obtain same. The check-weighman, where one is employed, shall keep a turn bulletin for the turnkeeper's guidance. The drivers shall be subject to whoever the mine boss shall designate as turn-keeper in pursuance hereof. This rule is not applicable, and shall not be considered as preventing the operator from driving entries as rapidly as he may desire.

DOUBLE SHIFTING ENTRIES

29. Miners shall drive double-shift entries when called upon to do so by the operator, and 25c. per yard extra shall be paid for pick entry and 20c. per yard for machine entry.

BURIAL FUND

30. A burial fund may be established by each mine or local, to which fund each miner shall contribute 25c. per month until a sum of not less than $75 and not more than $150 shall have been created, when collections shall cease until the fund is reduced by death, when a collection of 25c. per man per month shall again be made until the amount reaches the maximum agreed upon, and so on, and the operator shall contribute in case of death of miner, or any member of his family, an amount agreed upon by the operator and the Burial Fund Committee. In consideration of this contribution, it is agreed and understood that the miners and day men will not cease work to attend the funeral of either miner or member of the miners' family. However, if a miner is killed outright while at work in the mine, the mine may be closed the day of his death, but it shall resume work the following morning. This is not to be construed to mean that individual mine workers or relatives of the deceased shall not attend the funeral if they desire so to do.

31. There shall be a committee appointed known as the Funeral Fund Committee to take charge of these funds, and make all necessary funeral arrangements in case of any death, and said committee shall be paid for such duties as may be agreed upon locally.

ENTRY GOB

32. Where there is not sufficient room to gob the dirt and draw-slate in entries with ordinary conditions the loader or miner shall load it in bank cars and the company shall unload it.

MEMBERSHIP IN U. M. W. OF A.

33. The following employees are not eligible to membership in the United Mine Workers of America; Mine boss, inside boss, weighman, dock boss or boss trimmer, stable boss, electrician and night watchman.

34. It is understood that in the event of a disagreement between operators and mine workers, steam and electrical engineers, firemen and pumpmen are required to continue to perform such work as is in line with their duties.

TRACK-LAYER

35. No mine shall be compelled to hire more than one man as head tracklayer; all others shall be known as helpers, and so paid, and all helpers shall be expected to do such work as is laid out for them by the head track-layer.

DEAD-WORK—LOCAL CONDITIONS—INCREASE IN COST

36. For dead work where unusual conditions exist, the price to be paid for same shall be a question for local adjustment, but no local demand shall be made that will increase the cost of coal during the life of this agreement unless mutually agreed upon.

37. Under the terms of this contract nothing shall be done or enacted that shall increase the cost of producing coal to the operator, or decrease the earning power of the mines, except by mutual consent.

38. During any strike or suspension, it is hereby understood that all men on all kinds of outside construction and repair work, together with all men at such kinds of work inside the mines as does not produce coal, must continue at work; and it is further understood that such miners as are necessary are to be permitted to mine coal for the boilers and domestic consumption on the property; but this is not to be construed to mean to mine coal for shipment.

SPLINT COAL SEPARATION

39. Where splint coal is separated and thrown back, to meet exceptional market conditions and afterward loaded, there shall be paid 12½c. per ton extra.

DAY WAGE SCALE

40. Though in many cases a higher wage than the Kanawha scale is paid for day labor, the right is reserved to apply the Kanawha scale for day wages should the companies elect to do so.

41. All local rules in violation of this contract shall be null and void and no local union or group of local unions shall pass any rules which violate it, neither shall any company enforce any rule in violation of this contract.

Scale of Prices

Basis—Ton, 2000 Pounds—Run of Mine

KANAWHA THICK VEIN NO. 1 AND 2 SEAMS	
Pick mining	$0.49
Pick mining, Powellton seam	0.46¼
Yardage in pick entries and breakthroughs between entries	1.08¼
Machine loading in rooms	0.26
Machine loading in entries, breakthroughs in entries and room necks	0.31
Machine cutting in both rooms and entry	0.06½
KANAWHA HARD COAL NO. 5 SEAM	
Pick mining	0.51
Yardage in pick entries and breakthroughs between entries	1.19
Machine loading in rooms	0.27
Machine loading in entries and breakthroughs in entries and room necks	0.31½
Machine cutting in rooms	0.07
Machine cutting in entries and breakthroughs between entries and room necks	0.08
Screened coal to be paid on basis of percentage of screenings	
COALBURG SEAM—RUN OF MINE	
Pick mining	0.56½
Yardage in pick entries and breakthroughs between entries	1.35
Machine loading in rooms	0.32½
Machine loading in entries and breakthroughs in entries and room necks	0.37
Machine cutting in rooms	0.07½
Machine cutting in entries and breakthroughs between entries and room necks	0.08¾
COALBURG SEAM OVER 1½-INCH SCREEN	
Pick mining	0.81¾
Machine loading in rooms	0.43
Machine loading in entries and breakthroughs in entries and room necks	0.51½
Machine cutting in rooms	0.10
Machine cutting in entries, and breakthroughs between entries and room necks	0.11½
RAYMOND CITY SEAM	
Pick mining over 1¾-in. screen, per hundred bushels	2.87
Yardage in entries and breakthroughs between entries	1.35
CEDAR GROVE SEAM	
Pick mining	0.56½
Yardage in pick entries and breakthroughs between entries	0.92
Machine loading in rooms	0.32½
Machine loading in entries and breakthroughs between entries and room necks	0.37
Machine cutting in rooms	0.09¾
Machine cutting in entries, and breakthroughs between entries and room necks	0.10¾
OTHER SEAMS	
Lewiston seam to be same as Coalburg	
Kanawha seam to be same as Coalburg	
Elk River seam same as Kanawha Hard Coal or No. 5 seam and Coalburg	
Winifrede seam same as Coalburg	
Gauley River seam to be based upon Kanawha seams that apply to them	
INSIDE DAY LABOR	
Water haulers, machine haulers and drivers of one mule	$2.05
Drivers of two mules	2.16
Motormen and machine runners	2.55
Tracklayers	2.43
Tracklayers' helpers	2.00
Slate shooters	2.28
Couplers	1.18
Greasers	1.08
Trappers	0.87
All other inside day labor	2.00

Signed:

On behalf of the miners:
THOS. CAIRNS
C. C. GRIFFITH
THOS. HAGGERTY
BEN F. MORRIS

On behalf of the operators:
EDW. SCHONEBAUM
MICHAEL GALLAGHER
D. C. KENNEDY
D. T. EVANS
J. W. DAWSON.

The Labor Situation

SYNOPSIS—There has been no marked development in the labor situation. The strike of the Lackawanna employees still threatens. That in Ohio drags along wearily, the participants suffering much destitution and many of the mines having been flooded. The men driven from Prairie Creek, Ark., by the rioting Union men are also destitute and their families are, in many cases, scattered. The Western Federation of Labor may unite with the United Mine Workers of America. The Scotch miners desire a 4-day week.

The dispute regarding the patrolmen of the Delaware, Lackawanna & Western R.R. coal department has reached a menacing stage. Colonel R. A. Phillips, general manager, recently refused to treat further with the miners on the subject. On July 18, the general grievance committee of the Lackawanna miners met in West Scranton and voted unanimously in favor of a strike at all Lackawanna collieries unless the company officials agreed to discontinue the patrol system. The meeting was attended by 72 men from 18 different collieries, employing more than 10,000 men. The question was referred to the locals for ratification where the referendum vote was everywhere favorable. It did not, however, provide for a strike, but only gave the general grievance committee power to call one at any time.

It has been quite generally thought that the action of the company in closing its collieries recently for short periods arose not from lack of orders, but from a desire to let the miners have an early foretaste of the idleness they are seeking. If that is really so, which is somewhat unlikely, for business is now facing the regular summer dullness, the company could hardly be blamed, because the strike against the patrolmen is a flagrant violation of the agreement and should subject the union to suit by all the regular laws of business. The company, however, is disposed to treat with its men despite the earlier declaration, and on July 22, Col. R. A. Phillips, the general manager, had a conference with D. Fowler, the chairman of the grievance committee.

It will be remembered that in accord with James E. Roderick's suggestion, a safety patrol was inaugurated at great expense to the company. The miners said the men were spies and demanded their discharge. The local grievance committee has so far acted on its own authority, John T. Demsey, the president, participating in only one of the meetings. It is doubtful whether the organization will support the miners, and it is believed that the company may seek an injunction to prevent a strike which violates the agreement entered into by the company with the United Mine Workers of America.

The safety patrol, known by that or any other name, has been the most successful means of reducing accidents, having been adopted also by the U. S. Steel Corporation's affiliated coal companies, the Lackawanna Steel Co. at Ellsworth and Cokeburg, and the Susquehanna interests in the anthracite region. It has and deserves the approval of every mining man and has always been proved to reduce accidents.

Safe practices are sometimes burdensome and the insistence on them annoying, but if the miners rise against safety inspectors they deserve and will receive the unstinted condemnation of the public, and the responsibility of the coal companies for accidents will be largely removed.

LAW BREAKING IN ARKANSAS

Lawlessness still continues in Arkansas and there is a disposition to criticise Attorney-General McReynolds for the preliminaries which led to the present situation. It has been altogether too general in the past to take the easy way in dealing with disorder and to wait till threatening and manhandling turn to arson and murder.

The head of the attorney-general's department had, it appears, ample warning. The mines at Prairie Creek are surrounded by several others in which are about 2000 union miners. Nearly half of these work in the mines of the Central Coal and Coke Co., which are located in the same valley and surround Prairie Creek on three sides.

On April 6, fully 1000 miners from the Huntingdon and Hartford field marched to Prairie Creek mine and sent a committee to confer with Superintendent Cameron. Haulage ropes had been stretched around the plant and the crowd surged around this barrier. Friction with the mine guards caused an outbreak and four employees were beaten. The superintendent had to withdraw his men from the mine and to put out the fires under his boilers.

THE INJUNCTION OF THE U. S. COURT

Now the statement of these facts might be considered biased, but the judge of the U. S. Court was so impressed with the evidence on inquiry that he made a temporary restraining order, later making it permanent, and he told the Mammoth Vein Mining Co. not to operate without notifying him. On notification, 50 U. S. marshals were sent to guard the mine. James C. McReynolds, the attorney-general immediately ordered them simply to observe the conditions and not to police the mines.

McREYNOLDS' ORDER RESULTS IN VIOLENCE

The marshals were ultimately withdrawn, and the operators, realizing the danger, hired about 125 guards. Those men, for some reason or other, failed to resist the force brought against them and 4 tipples, 2 fan houses, the commissary and boarding house were burned down. Two men were shot and their bodies incinerated so that their skulls and bones were all that was found of them when exploring the burned ruins of the log cabin in which they had been murdered. On the 20th of June, the Coronado tipple was also dynamited and destroyed.

Yet we find people who oppose injunctions and desire the lawless to complete their violence before they are restrained. All that is now needed to complete the farce is to send a few troops to prevent the Mammoth Vein Mining Co. from hiring any men to replace those who have been driven away. We suggest this only because it has been done already in Colorado. If we had not that example before us, we would label such an action "unthinkable," but a labor administration is liable to wink at every manner of violation of the constitution.

The men driven out of Prairie Creek have been separated from their families and are afraid to go to seek them. Most of them are destitute. The Bache-Denman Coal Co. is taking care of most of them, but unable to obtain work in the union mines and with the nonunion plants dynamited and burned down, their situation is deplorable for men in a free country.

PEACE IN OHIO

In Ohio the companies are still anxiously desiring to pump out the water from their mines. The Cambria Mining Co. July 20 started its pumps and fans at Pultney and Webb. Sheriff Anderson brought 50 armed guards to the Pultney mine, but the Webb mine was policed by private guards. The Fort Pitt mine is relying on Sheriff Anderson to supply deputies. Some of the I. W. W. agitators are in prison and the fever heat of the irresponsible miners has consequently declined.

In fact the awakening of Sheriff John Anderson has relieved matters considerably in Belmont County. He has inquired of Attorney-General Hogan whether men could legally be employed to protect mine property, and, of course, the attorney vouchsafed him the information that it was lawful and an obligation under conditions such as exist in his county. So Anderson recruited 150 miners to protect the pumpers and engineers. They were assigned to duty at the mines at Wheeling Creek, Lansing, Barton and Neff, and with the pumping forces working under their protection, it is expected that the mines can be kept in good shape until work is resumed.

It is reported that many of the Industrial Workers of the World left the county disgusted. Joseph Knoblocks, an I. W. W. agitator, is charged with treason. It is declared that he has levied war against the state, and that he has adhered to its enemies, giving them aid and comfort, and also he has failed to give information in his possession of impending acts of volence against the state and the public. The charge is unusual, but it is declared by officers that it can be fully substantiated by facts.

JACKSON DISTRICT TO WORK, OTHER DISTRICTS IDLE

Despite the efforts of operators to have the miners return to work under a temporary arrangement as to weighing both lump and slack coal, the miners in the Hocking Valley district held out all last week and demanded that all the coal be weighed at one time. Conferences of the scale committee of this district started July 20 and lasted for the week.

In the Jackson district an agreement was made and work will be resumed at once. In the Cambridge district a number of the mines have resumed operations. Nothing has yet been done toward signing a scale agreement in the eastern Ohio district.

As a result of appeals to the people of Ohio and West Virginia, funds have been collected for the relief of the families of miners in the Ohio field affected by the recent strike, and commissaries have been opened in about a dozen of the mining towns from which free provisions and household supplies will be dispensed as long as the money holds out. It is said that the distress among the miners has in many cases become acute, rendering immediate relief imperative to avoid actual suffering and death from starvation, and the commissaries were opened to afford prompt aid.

Funds for the suffering striking miners and their families in Ohio have been asked for by the Ohio Federation of Labor at a recent meeting in Columbus. Reports from various districts of Ohio show that there is much suffering among the miners and their dependents, and in many cases subscriptions have been taken up in their immediate localities.

LATEST NEWS OF MINE SCALES

Settlements in Ohio districts are not materializing as actual agreements. Those who signed a mine-run contract on the basis of 47c. a ton have discovered that the local conditions are likely to prove as much an obstacle as was the general scale. Increases are sought for all classes of help and the miners have assumed the position that they made a big concession when they accepted 2c. less than the full demand of 49c., and they should not be asked to concede anything in the framing of local scales. This has delayed the opening of mines in the Hocking, Cambridge and southern Ohio fields. It also appears that the operators are not to be allowed to pay a mine-run scale by weighing three-quarter coal and slack separately, and adding the weights thus obtained. This procedure will be necessary while alterations are being made in the tipples at some of the mines and was sanctioned by the state union officials. ?

Tipples are generally squatty in the Hocking Valley, and it will require a month if not longer to rebuild them. In the meantime the operators hoped to mine coal and take advantage of the demand for steam grades.

The land owners are now objecting to coal being mined on the mine-run basis. All royalties, where paid, are based on three-quarter coal. The land owners are not willing in some cases to rearrange contracts on the mine-run basis because such mining will result in the destruction of the market and eventually will hurt the reputation and reduce the value of the fields. They also are asking more per ton under the mine-run scale than the equivalent of the old royalty on three-quarter coal.

Altogether the situation is not clearing up as rapidly as was hoped. It is frequently predicted that the No. 8 field will be producing coal before the troubles are all settled in other parts of Ohio.

John M. Roan, chief of the Ohio department of mines, denies that he said that eastern Ohio operators would sign the scale giving 47c. for machine-mined coal and 67.6c. for pick-mined coal. The quotations from his recent speech at Bellaire, Ohio, as given in the papers, were incorrect in that particular, according to his statement.

LOCAL DISPUTE IN WEST VIRGINIA

In West Virginia, in the New River district two small strikes were called. One is at Elverton, where 80 miners quit because the company refused to permit the employment of a check-weighman who, they declared, was incompetent. However, the matter was compromised, by putting the father of the elected weighman in the younger man's place. At Kaymoor No. 2 about 50 miners quit because they would not work with a man who had been a guard at the Loup Creek mines.

THE SOUTHERN CONFERENCE

News from Kansas City, where an agreement for the Kansas, Oklahoma, Missouri and Arkansas fields is being made, is scant. Committees consisting of 8 representatives of miners and 8 representatives of operators were formed for each of the four states. These committees will meet separately and provide different agreements for each state. The contract is to be for two years.

DISCONTENT WITH INDIANA AGREEMENTS

In Indiana the delegates from Linton, Clinton, Shelburn, West Terre Haute and Glen Ayr brought formal charges on July 22 against William Houston, president, and James Shiel, vice-president, respectively, of the 11th district of the United Mine Workers of America, also against Thomas Moss, a member of the district board. These charges allege violations of the working agreement in settling strikes. President Houston is charged with neglect of duty. The complainants desire that all three men be removed from office.

WEST KENTUCKY FIGHT

In Muhlenberg County, in Western Kentucky, there has been armed strife between the Bevier Coal Co. and the strikers at Cleaton. The employees of this company, as well as those of the Nelson Coal Co., are on strike, alleging that the employers have broken a contract entered into when the Western Kentucky Coal Operators' Association and the Union Miners met at Louisville in the spring, when the operators agreed to haul the men into the mines. The Bevier company has withdrawn from the operators' association and refused to provide the men with transportation.

The violence consisted of an attack, charged to the striking miners, on the quarters of J. P. Cox, superintendent of the company, at Cleaton. A charge of dynamite was exploded one night last week in the store over which Mr. Cox had his rooms, but Mr. Cox, with a bodyguard, which had been concealed outside, broke up the mob by firing buckshot into its ranks. It is said that 25 men participated in the attack. Five men are known to have been severely wounded and it is reported that one fatality resulted. The authorities are investigating.

COLORADO STRIKE NEARING CONCLUSION

The Colorado situation is unchanged except that as the union funds become more and more depleted, the more do the leaders allege defections of men working at the mines and the more fervently do they appeal for federal intervention. The Union is severely short of funds except in a few of the locals, and those which have the money are keeping it. So it is necessary to find another and better way to end the strike, and the new way sought is by nationalization of the Colorado mines.

It was announced the other day that Samuel J. Gompers, president of the American Federation of Labor, had been asked to head the movement, which shows that it is an impulse arising with the United Mine Workers Union. That Mother Jones and John W. Brown are advocating it seems also to suggest the source of the inspiration.

THE OPERATION OF MINES BY THE NATION

We are by no means either against public ownership of utilities or national socialism. We believe private property is only of value as it promotes happiness and prosperity, and we look, indeed, for a gradual assumption of federal control as time proceeds and socialism becomes not so much a mere creed to enforce on others as a private practice which the individual will enjoin on himself. In fact for socialism we need more socialists—men who aim alone at the social and not at their personal welfare. Such men are rare in all classes of society.

Just recently appeared the German report on insurance for 1913. The wages at the privately owned monopolistic coal mines in Westphalia are $402 per year. In Upper Silesia, the privately owned coal mines paid their men $280. The state coal mines at Saarbruecken paid $327. Thus the state employees received a wage 16 per cent. greater than the Upper Silesia corporation workmen and 19 per cent. less than the employees of companies in the Westphalia district. State ownership consequently, has not been of great benefit to these German coal miners.

THE MINING UNIONS TO COMBINE

The Western Federation of Miners met in its 21st Annual Convention at Denver, Colo., on July 20. President Charles H. Moyer, in his report, said that none of the officers in the Western Federation disapproved of confederation with the United Mine Workers of America. John McLennan, president of District No. 15, U. M. W. of A., called attention to the fact that his organization took steps favorable to the proposed merger at the last convention at Indianapolis, Ind.

From such a union the only gain will be increased numbers and larger funds with countervailing larger responsibilities and divergent interests. There is no real gain such as accrues when two bodies join which are engaged in regulating the same industry in competing fields. The U. M. W. of A. will hardly be any more of a trust when it absorbs the W. F. of M. than it is now, for it already is in undivided control of the unionized coal mines. While the W. F. of M. is even more disposed to violence than the U. M. W. of A., it is hardly likely that the affiliated body will make a perceptible difference in the conduct of strikes and the making and breaking of agreements between coal operators and men. In fact the W. F. of M. may gain in responsibility far more than U. M. W. of A. will lose.

THE SHORT WEEK

The Scotch miners desire to work only 4 days a week. This is 208 days a year, as against 225 days worked in the United States in 1912. If the rule is strictly enforced and bank holidays and days for funerals are not added, the Scotch miners will still work almost as steadily as is customary in America, but the working days will be better distributed. However, it has always been looked upon as a hardship in

America that mining work has not been more steady. In Scotland, there will be a certain loss of trade to foreign countries as a result of the 4-day week, and here, if we decided on such a short week, there would be no less idleness in the summer, so that the working days might fall to 150 per annum.

We hardly think that the standard of living is so high that the Scotch miners are to be commended for seeking the 32-hour week. If it is so, they are imposing on the working men in other trades who have to give a longer period for equal pay. If the hours are to be reduced the rule should be universal, and it is a grave question whether any of us desire to reduce the standard of living by such a considerable factor. If we deliberately reduce production, we must expect to have less products to divide.

The Fife and Kinross miners have given their notice to the number of 20,000 and the operators have declared for a lock-out. So immediate strife seems certain unless a European war makes one of the parties grant a concession.

THE CLAYTON BILL

The Clayton bill (H. R. 15,657), which passed the House June 5, has been favorably reported to the Senate after exhaustive deliberation and many amendments.

Section 2 was so amended as to permit discrimination in price . . . "made in good faith to meet competition and not intended to create monopoly," and also to permit the selection of customers "in bona fide transactions and not in restraint of trade."

Section 3, putting a restriction upon the sale of mine products, was stricken out.

Section 7, is amended by eliminating fraternal and consumers organizations, and inserting the word "lawfully" as applied to the carrying out of the legitimate objects of the organizations referred to. The section as amended reads as follows:

Sec. 7. That nothing contained in the antitrust laws shall be construed to forbid the existence and operation of labor, agricultural, or horticultural organizations, instituted for the purpose of mutual help, and not having capital stock or conducted for profit, or to forbid or restrain individually members of such organizations from LAWFULLY carrying out the legitimate objects thereof; nor shall such organizations or the members thereof be held or construed to be illegal combinations or conspiracies in restraint of trade, under the antitrust laws.

Section 18 is amended to read as follows:

Sec. 18. That no restraining order or injunction shall be granted by any court of the United States, or a judge or the judges thereof, in any case between an employer and employees, or between employers and employees, or between employees, or between persons employed and persons seeking employment, involving or growing out of, a dispute concerning terms or conditions of employment, unless necessary to prevent irreparable injury to property, or to a property right, of the party making the application, for which injury there is no adequate remedy at law, and such property or property right must be described with particularity in the application, which must be in writing and sworn to by the applicant or by his agent or attorney.

And no such restraining order or injunction shall prohibit any person or persons WHETHER SINGLY OR IN CONCERT from terminating any relation of employment, or from ceasing to perform any work or labor, or from recommending, advising or persuading others by peaceful means so to do; or FROM PEACEFULLY PERSUADING ANY person to work or to abstain from working; or from WITHHOLDING THEIR PATRONAGE FROM any party to such dispute, or from recommending, advising, or persuading others by peaceful AND LAWFUL means so to do; or from paying or giving to, or withholding from, any person engaged in such dispute any strike benefits or other moneys or things of value; or from peaceably assembling in a lawful manner, and for lawful purposes; or from doing any act or thing which might lawfully be done in the absence of such dispute by any party thereto; nor shall any of the acts specified in this paragraph be considered or held to BE VIOLATIONS of THE ANTITRUST LAWS.

Section 20 provides that trials for violations of injunctions "may be by the court or upon the demand of the accused by a jury."

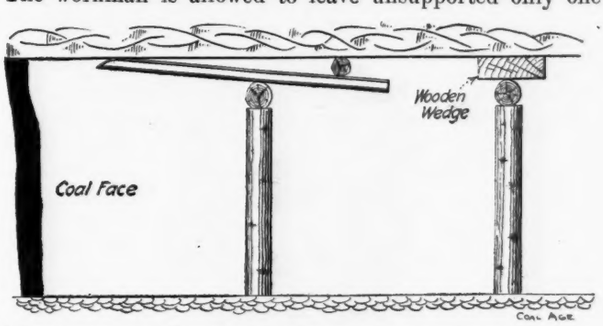
Section 21 provides that judgments of conviction for contempt "may be reviewed upon writ of error in all respects as now provided by law in criminal cases."

The bill is now before the Senate and will soon be taken up for final consideration. The favorable amendments thus far made to the bill justify a hope that continued effort may secure further modifications which will be of advantage. Now if peaceful persuasion is prohibited to more than 5 men in a group, within 1000 ft. of a man's working place or his way of approach thereto and only one man is allowed to appeal to him at a time at his home, the Clayton bill will do a great deal to make injunctions unnecessary and violence less frequent. The difficulty of deciding whether persuasion is peaceable or the reverse has made the injunction necessary. By limiting either the number of persuaders or the necessary proximity of the victims to their forcible logic the freedom to contract and labor may be preserved to working men.

How the French Protect the Man at the Face

Practical Coal Mining describes an interesting method of forepoling in use at the Courrières colliery in France, the mine where the largest mine explosion in history took place. The method has been commented on favorably by George S. Rice, of the Bureau of Mines, who saw it in operation. An iron bar of girder section is pushed forward over the last cross-bar, so as in a manner to forepole the roof. When the place is advanced far enough for putting in other timbers and cross-bars, light laggings are substituted for the iron bars; these are temporarily supported by light props till the permanent timber sets are erected.

The bars are formed of I-section iron about 4 ft. long, 1¼ in. wide and 1¾ in. deep. The front or chisel end is made by heating the metal and hammering the top flange downward till it is welded to the bottom flange. The workman is allowed to leave unsupported only one



A TEMPORARY METHOD OF SECURING THE ROOF AT THE COAL FACE

foot of roof between the iron bar and the face. As soon as that distance is exceeded, the bar must be driven forward again. In driving through heavy falls, similar iron bars of stronger cross-section are used.

Only in this latter case probably would this French system meet American requirements, but in many places a slight and obvious modification would serve to add greatly to safety.

Coal Mining Institute of America

A meeting of the executive board of the Coal Mining Institute of America was held July 14, in the office of W. E. Fohl, Farmers Bank Building, Pittsburgh, Penn. The date of the winter meeting was set for Dec. 8-9, and the Fort Pitt hotel was arranged as the place of meeting. All the details of the program are not completely determined, though the groundwork is laid.

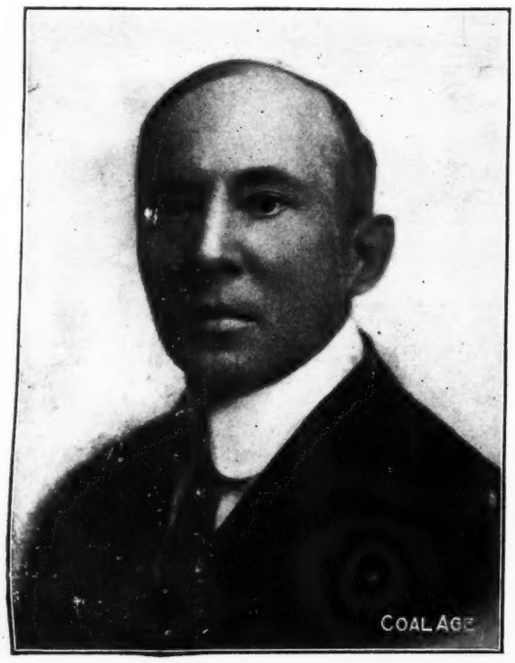
Early in the 18th century the mine light par excellence was a tallow dip set in a lump of wet clay. When gas tests were to be made, the experienced miner surrounded the wick of this brilliant light with more clay. The "fire man" of those days, prototype of the modern fire boss, must have been a man of much nerve and little caution, as his duty was to rid the mine of gas by firing it. Clad in damp leather or sack cloth, his work compelled him to lie prone on the floor and light the gas suspended in the air above him. If he survived the explosion he returned to the surface and reported the mine safe. Another method of disposing of gas was the use of "eternal lamps," kept burning continuously in gaseous mines to burn the gas as fast as it was generated.

Who's Who in Coal Mining

Jesse K. Johnston

Few men are more prominent in the affairs of the western Pennsylvania coal-mining industry than Jesse K. Johnston, of Wilkinsburg, Penn. He is the type of man who is able to handle matters other than those of a purely local nature, and for this reason his influence has extended beyond the limited sphere of his personal interests.

Mr. Johnston was born at Georges Station, Penn., Jan. 2, 1867. His mother was Louisa Kilgore, granddaughter of Capt. David Kilgore, who served with distinction in the Eighth Pennsylvania Regiment during the Revolutionary War. Pennsylvania history records the fact that Mr. Johnston's great-grandfather, Capt.



JESSE K. JOHNSTON

Kilgore, sold his mill property in order to secure sufficient money to clothe the military company under his command. For this act of generosity and patriotism, Capt. Kilgore never asked nor received compensation from the government.

But to return to the present subject of this sketch, Jesse Johnston. He was educated in the Greensburg High School, following which theoretical training he secured employment as topographer with the Pennsylvania Railroad. His next position was that of engineer with the Barberton Belt Line R.R. in Pennsylvania.

Mr. Johnston's first important work in coal mining was with the Pittsburgh Plate Glass Co., for which concern he served as general mine superintendent. Following in succession, he became president of the Lumberport Coal Co., vice-president of the Pitcairn Coal Co., president of the Charleroi Trust Co., president of the Charleroi Improvement Co. and president of the Coal Mining Institute of America.

While superintendent of the mine at Charleroi, he introduced electricity into his colliery, being the first superintendent in the Monongahela Valley to effect such an improvement. A second innovation introduced by Mr. Johnston was the plan of moistening the ventilating current in his mines by exhaust steam. He does not make claim, however, to having been a pioneer in the use of this particular safety precaution.

Mr. Johnston is a member of the American Mining Congress, American Institute of Mining Engineers, Engineers Society of Western Pennsylvania and the Coal Mining Institute of America. He has prepared a number of technical papers for presentation before coal institutes. Some of his most recent contributions are as follows: "Loss of Life in Coal Mines Compared with Other Hazardous Occupations," "Characteristics of the Thick Vein Freeport Coal Seam," "Safety Chambers in Underground Workings of Coal Mines" and "A Study of the Wages and Selling Price of Coal in the Pittsburgh District."

Anthracite Mine Fatalities

The death rate per 1000 employed in anthracite collieries has always remained about the same. The figures did not grow persistently higher up to 1907, as did those for the bituminous coal mines. Whereas, the bituminous mines are slowly regaining their former values, the anthracite region shows increased safety per ton produced and almost equal safety per thousand employed. The fact that the death rate has by one method of calculation barely increased and by another and more correct method has actually decreased, is due largely to the efforts of the operators and first-aid men to reduce accidents.

From 1881 to 1889, inclusive, the number of tons of coal produced per fatal accident was 142,287. In the following decade, the number of tons dropped to 141,915, and from 1900 to 1909, during which time mine rules were more strictly enforced and many safety devices and danger signs were introduced, the number increased to 153,717. The average for the three years 1910, 1911 and 1912, was 160,591. The figures are from the latest annual report of the Pennsylvania Department of Mines.

Basing the estimate on thousands of employees, the death rate from 1881 to 1889 inclusive was 4.45; from 1890 to 1899 inclusive was 4.27; from 1900 to 1909 inclusive was 4.24. The average for the first three years of this decade was 4.32.

Mine disasters are so dramatic and terrible that they are given prominent display in the newspapers of all countries, and this has given rise to the erroneous impression that mining is the most dangerous of all occupations. A recent study of the casualty record of the coal mines, railroads and steel mills in this country, however, revealed that mining was the least dangerous occupation of the three. In 1911, the latest year for which there are official figures in the three industries, 31,334 of the 729,279 coal miners were injured; 126,039 of the 1,669,809 railroad employees; and 35,764 of the 158,604 steel employees. A reduction of these figures to a common basis brings out the fact that for each thousand men employed, 225.48 were hurt in the steel mills, 75.48 on the railroads, and 42.96 in the coal mines.

Editorials

Washouts, Sandbars and Distortions

The first impulse on finding that coal is absent where there is no evidence of faulting is to assume that it was either never deposited or that it was removed by erosion. Some of the coal thinnings and removals result, however, from the effect of readjustment of measures under side pressures. When the rock structure of the earth was subjected to strain, the yielding coal, clays and shales suffered more than the harder strata. This is clearly brought out in Boulton's "Geology of the Coal Measures," forming the first part of the Practical Coal-Mining series, recently published by the Gresham Publishing Company.

Thus in the Somersetshire coal field of England are several "wants," which were believed for a long time to be "washouts" contemporaneous with, or immediately sequent on, the deposition of the seam. But it was found by Mr. Steart that the coal had been replaced not by the hard sandstone of the roof, but by the soft black shale of the floor, that the areas believed to be eroded were too irregular to be the streams of ancient rivers, and that the "wants" occurred most frequently in the vicinity of badly faulted measures and not infrequently paralleled them roughly. Furthermore, in some places the coal became much thicker and consisted of layer upon layer of coal piled on one another. What is more, the thinnings were not common to one bed alone, but were found superposed in several of the beds in any locality.

It is true that erosion by relieving pressure may have produced a flow in the coal measures, especially in newly deposited beds, and that, consequently, thickness exceeding the normal may be due to the exuding of embryotic coal from lightly pressed to unpressed areas. It is also true that a depression, such as causes erosion, may be produced repeatedly in the same place during the deposition of different coal beds, but while these are possible and often probable explanations, the evidences seem sometimes rather to point to the causes being more recent and the action more violent.

The amount of displacement of the coal in the seam in many cases has a relation to the softness of the material on which the coal rests. Where the floor is a hard fireclay, it has failed to transfer so severe a strain to the coal. Further evidences of the dynamic rather than the hydraulic origin of these "wants" are that the appearance of the carbonaceous masses is so smoothed and polished as to suggest extrusion, the striations of the roof are at right angles to the main axis of the overfolds of the district, and in some cases where the thick coal appears, a thin layer of cannel occurs on the top of each layer of coal, as if the quintessence of the bed has been squeezed out under pressure.

While in English coal measures the pressures have been more severe than in much of the bituminous area of this country, it would be well in every case to be cautious in assuming that "wants" are erosions or sandbars wherever they appear. Of course, some will say that it is of no importance what are the causes, but where one is in doubt as to the best way in which to deal with disturbed ground if the cause is rightly determined, the extent of the trouble and its general nature will be better evalued.

The Folly of Defense

There are few persons more unfortunate than a defendant. Seldom does he succeed in being triumphantly vindicated. He often says that he is, and his closest friends confirm him in the statement, however, with less assurance than he himself usually shows; but as a matter of fact, he is besmirched even if there is barely a scintilla of evidence.

And the logic is, don't be a defendant, be a prosecutor. Fail you may, but you are unhurt by that fact for the sting of accusation is still left to plague the defendant. However, it is a poor maxim to advocate this scourging of opponents unless you are sure of the essential justice of your ground and can let loose with a clear conscience.

The leading defendant, the perpetual defendant, is the coal business. The folly of defense has been perpetually evident in the history of colliery ownership. A mean and puny part is that occupied by the industry which, charged with many shortcomings, meets some, extenuates others and admits a few. We all have faults and so the part of the defendant fits us ill; we all should be above suspicion, so contumelious reproach makes cowards of us all.

The successful people are those who attack, who deliver a blow on the ground of their opponent. The wildcatters and smaller oil men of Oklahoma recently fiercely denounced three big oil companies operating in that state. They accused them of all kinds of discriminations, combinations and duress, and, as a result, the public of Oklahoma got to think these wildcatters and smaller oil men needed assistance and enabled them to form a trust of the most law-breaking description.

Thus also the farmers of Missouri attacked the Harvester Trust. The court ruled, to quote the *Independent*, that the slight increase in prices had been preceded by a greater increase in the prices of labor and material, that the increased cost of construction and the improvement in the machines more than offset the increased price, that there had been a reduction in the cost of repair material, that "farmers generally" had "profited by" the companies' competition with other manufacturers, that independent manufacturers "had not suffered by reason of the combination," that many retailers had testified that the company used no unfair methods in the treatment of competitors, and that "on the whole the evidence shows that the company has not used its power to oppress or injure the farmers, who are its customers."

Nevertheless, George W. Perkins and Thomas D. Jones are both besmirched by their connection with this trust. One is in danger of being thrown out of his party and friendship with him has been regarded as casting a stigma

on his most prominent political supporter. The other is subjected to congressional abuse and questioning and debarred from service on the Federal Reserve Board. But on the other hand, the farmers who yelled so lustily at the combination of others, are about to get a bill passed through Congress, permitting them to combine to their hearts' content.

These instances we might continue to multiply but, without further parley, the work cut out for coal men is very clear. Be aggressive. Do not say our profits are too small, we are *not* coal barons; let us point rather to the fortunes of those who oppose and oppress us. No coal man ever made such profits in mining as are made by makers of breakfast foods, soaps, automobiles and a hundred other articles. Let us then rather clamor that such men be restrained and convince the citizen that while wasting his energy in chasing a dog with a can tied to its tail, he is overlooking the slick person who, aiding in the chase, is filching that worthy gentleman's purse.

In the age of feudalism, the seller was little better than a serf; the buyer was a lord. So we have learned as a race to be humble as sellers and lordly as buyers, forgetting that rightly he who buys has as many obligations as the seller. And, by the way, this applies as much to the sale of labor as of any other community, though we are slow to believe it.

The buyer believes he, the lord, has a right to receive coal from the serf whenever he is graciously pleased to buy it. He would have the mines seized if he cannot get the coal he needs. But, viewing the seller as equal to the buyer, why have not the manufacturing establishments of all kinds been seized or at least coerced by government to go on buying coal during the present lull in business? If the seller must saddle and go to market, must not the buyer be there to meet him? If for failure to ship coal, the freedom of the coal operator and miner is to be removed, why not subject the manufacturer to an equal duress when he has a strike and ceases to buy? What are the profits of the manufacturers to the coal man, for none of them has ever cared if the latter made a living?

Only by rebates, promotions, real-estate deals and leases has money been made in the coal business in the past; almost as much has been lost as gained in real coal extraction. What rascality, keenness and chicanery the business has known has almost all come from bankers and lawyers and not from the real operating and developing heads. But let us not enter any defense, seeing we have so clear a line of attack? Let us bring our suit against the exploiters of the public and pursue it without any fear of having to enter a barren *nolle prosequi*.

Co-operative Mining in Illinois

In the recent activity in coöperative mining in the Illinois coal field, a unique condition has been developed replete with interesting possibilities. The move savors strongly of socialism, and indeed there are many rumors current to the effect that radical socialists are the controlling factors in the companies involved.

The innovation is unique in, that, for the first time, we find both capital and labor lined up on the same side. In this modern age of continual and, at times, almost bitter strife between these principals, the situation is indeed unusual, which unites them in a common cause; but such is clearly the case in this instance.

By working on a fluctuating scale, varying according to market conditions, and frequently ranging well below union wages, the coöperatives are violating the most sacred principle of organized labor. On the other hand, the independent, legitimate operators of Illinois are the most acute sufferers. Uncontrolled by the customary principles of economies, which establish an approximately uniform cost basis in all lines of industrial endeavor, the mutual operators continue dumping their product on the market irrespective of the prices received.

While the tonnage involved is relatively small, as compared with the output of the entire state, it is obvious that business along these lines must inevitably demoralize a slow or even normal market. Certainly, the regular companies, compelled to meet a fixed cost of production, cannot compete with such uneconomic methods.

The legitimate operators, having signed contracts with the Illinois Mine Workers adopting a fixed rate of wages, naturally feel justified in holding the union officials responsible for this condition. Indeed, the path of the labor officials is strewn with many difficulties. With the operators assailing them on the one hand for permitting gross violation of the wage scale, and the coöperative miners on the other hand giving up their union charters rather than abandon their mines, the situation is steadily becoming more tense. The issue cannot be long delayed and may ultimately be more far-reaching in its effects on the coal industry than now seems apparent.

Perhaps one of the most distressing features of the situation is the strong appeal for sympathy one must feel for certain cases of the coöperatives. For instance, let us consider the case of some of the older miners, men on the final decline, who are unable to longer stand the rapid pace set by younger, more energetic and ambitious men; coöperation of such men for their mutual protection seems eminently just.

Again, we have a case of a mining community threatened with abandonment. It frequently happens that the more thrifty men in such locations have invested their earnings for long periods in small homes, the intrinsic value of which is directly dependent upon the continuation of mining operations. Will either capital or labor attempt to restrain such men from protecting their interests at whatever sacrifice they see fit to make?

Rules for Mining Plants

Rules, general and special, have been written and posted on our tipples on behalf of men, many of whom cannot read. But rules for mechanics and others who can read and whose duties keep them near where the rules may be posted, we too frequently omit. We need rules to prevent fires, to promote safety, efficiency and economy. They do not need to be stringently written. The average mechanic is a proud man or he would follow a line of work demanding less originality and enterprise. His pride is his asset; do not deprive him of it, but give him rules so couched that they will appeal not to his fears, but to his loyalty and intelligence.

One of the results of the "safety" campaign carried on by the Reading Coal & Iron Co. the past year has been the adoption of broad leather washers on the hand-drills of the miners. This precaution has saved many a crushed finger.

Extracts from a Superintendent's Diary

About the most ludicrous, and yet withal the most pathetic sight imaginable, is presented when one encounters unexpectedly one of our typical miners "dressed up."

Today while in the city I chanced upon two who came within the full meaning of the phrase—Tony Williams and Ray Ivy.

Both were bedecked with high, generously starched collars, fancy cravats and waistcoats (after a man has made a study of tailor books and magazine clothing ads. these days, he will assure you that vests and waistcoats are quite different garments), fancy socks, patent leather shoes, creased pants, etc.

Both of them are married men with families, and why they should feel called upon to prepare themselves for dress parade in the city is not evident. Possibly the gaudy posters furnished by the tailoring companies, displayed to such excellent advantage by our commissary manager, could not be resisted, or perhaps a desire to get even with the wife for buying a new dress on credit may have furnished the motive. Be that as it may, every time I happened out on Main St., Tony and Ray were very much in evidence.

Occasionally I overheard passersby discuss them, and everyone who noticed them turned about and observed them critically.

I happen to know that Tony took Bob Jones, our timekeeper, to town with him when he selected his tie, vest and socks, after purchasing a suit from the tailoring company that handles the orders taken by our commissary. (It's easy to believe that commissary clerks might not be eminently fitted to take suit measurements; at least it would be easy to believe that after having gazed upon Tony arrayed in all of his glory.)

Bob is the Beau Brummel of our community, and his taste in dress is beyond question, but it is possible that he decided that our camp is displaying too little originality in the gentle art of choosing raiment and so decided to lead Tony into new pastures. At any rate, judged by conventional standards, Tony was curious looking.

It is possible that I am doing Bob an injustice, and instead of trying to put one over on Tony he had planned to make his tie, socks and waistcoast so conspicuous that Tony's bowed legs, gnarled back and tremendous hands should escape notice. In this, however, giving him the benefit of the doubt, he failed singularly, for poor Tony was followed by a crowd of jeering boys throughout most of the day, and their remarks had reference mostly to "the shape of that guy with the cuffs on his pants."

Ray Ivy early in the day decided that his neck was too large for "biled" collars, so he partially disrobed at a fruit stand and presented the offending collar and his cravat to a blind beggar. Later on, his patent leathers becoming unendurable, he stopped in a second-hand store and swapped them for a pair of boots. Now pants with cuffs were designed by tailors who never heard of boots; Ray gave the cuffs to a messenger boy who was trying to mend a leaky bicycle tire with a piece of handkerchief.

Both Tony and Ray are active members of our first-aid team. While we were en route home tonight they got into a heated discussion with some of their companions about the most suitable topic for next week's first-aid discussion. Bob Jones, sitting over in one corner of the coach, apparently trying to sleep, rose up about this time and remarked that he had never heard any of them make a suggestion as to the first-aid best adapted for a fellow being choked by a necktie. Forthwith, Tony jerked off the offending member of his garb, amid the jeers of the balance of his companions.

Recent Legal Decisions

Responsibility for Failure to Make Repairs—A coal mining company is liable for injury to a miner caused by a defect which it negligently failed to repair after the general superintendent had had knowledge of its existence for several days. (Alabama Supreme Court, Sloss-Sheffield Steel & Iron Co. vs. Dobbs, 65 "Southern Reporter," 360.)

Miner's Choice between Safe and Unsafe Ways.—When a coal miner has a safe means of exit through one entry, he assumes the risk of being injured in passing through an entry which he knows to be unsafe. (Kentucky Court of Appeals, Elliott vs. Greenville Coal Co., 167 "Southwestern Reporter," 424.)

Right to Recover Price Paid for Machines—Under the following state of facts, the owners of a mine were held not to be entitled to recover money paid for machines intended to be used in mining and loading coal: It was agreed between the parties that the machines were to be similar to a machine made by the manufacturer for another mine owner and then in use, with such changes as might be decided upon by the manufacturer and the buying mine owners' manager, to whom the specifications for the machines were to be submitted. The machines were to be furnished at cost, and put in place, "in order to demonstrate their abilities." The mine owners sued to recover the price of the machines, on the ground that they proved to be useless, and that the manufacturer impliedly warranted that they would do the work for which they were ordered. The manufacturer defended the suit on the ground that the buyers' manager had examined an experimental machine made by the manufacturer, and believed that a similar machine could be used in the mine; that during the construction of the machines the manager required a change in power from electricity to compressed air, in order that the machines could be used in gaseous mines; and that this change greatly increased the cost of manufacture—to an amount in excess of the price received by the manufacturer. This defense was sustained by the court, on the ground that the agreement was joint and experimental. (Pennsylvania Supreme Court, Rainey vs. Morgan, 88 "Atlantic Reporter," 798.)

Railway Company's Liability for Refusing to Furnish Cars—A coal operator can recover from a railway company damages resulting from the latter's discrimination against him in favor of other coal shippers, in refusing to supply cars, if the company had an adequate supply of cars on its tracks. (Pennsylvania Supreme Court, Sonman Shaft Coal Co. vs. Pennsylvania Railroad Co., 88 "Atlantic Reporter," 746.) The fact that a coal company instituted proceedings before the Interstate Commerce Commission to recover reparation for discrimination in distributing cars did not preclude subsequent suit against the same company to recover damages on account of discrimination relating solely to intrastate commerce. (Pennsylvania Supreme Court, Clark Bros. Coal Mining Co. vs. Pennsylvania Railroad Co., 88 "Atlantic Reporter," 754.) A railway company which discriminated against a coal shipper by counting cars owned by him in the number of cars allotted to him, whereas that was not done in the case of other shippers, cannot avoid liability for damages resulting to him, by showing that the Interstate Commerce Commission afterwards adopted an order requiring privately owned cars to be taken into consideration in apportioning equipment among shippers. (Pennsylvania Supreme Court, Stineman Coal Mining Co. vs. Pennsylvania Railroad Co., 88 "Atlantic Reporter," 761.)

Coal Used in Operation by Lessee Not Subject to Royalties—"Under the custom prevailing in the anthracite region, coal used by a lessee in the operation of the mine is not subject to royalties," in the absence of provision in the lease to the contrary. (Pennsylvania Supreme Court, Trustee of Proprietors of Kingston vs. Lehigh Valley Coal Co., 88 "Atlantic Reporter," 769.)

Discussion By Readers

Working Coal Seam with Heavy Parting

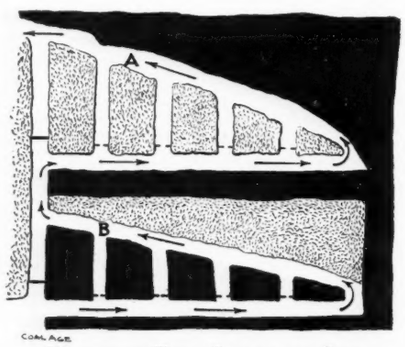
Letter No. 7—Replying to the inquiry of Fred Morck, COAL AGE, June 13, p. 981, I would suggest that he use a coal cutter capable of mining at any desired height above the floor, similar to the Jeffrey-O'Toole. The cut should be made in the base of the parting if the material will cut; if not, in the coal immediately under the parting. After completing the cut, take out the parting and load or gob it before disturbing the coal, so as to avoid loading dirty coal.

The disposition of the material of the parting depends largely on the plan of mining and whether this is a shaft or a drift proposition. If roof conditions are such as to make it possible to draw the pillars, the parting material should be removed from the mine.

W. D. HANLON,
Consulting Engineer, Railways-Mines.
Cleveland, Ohio.

Letter No. 8—Some years ago, an old mining teacher used to tell us boys, who attended his class, that the best way to reason was to use a concrete example to prove our argument. I agree that market conditions are important factors in working a coal seam with a heavy parting. However, from my observations, the thickness of the parting is the most important factor to be considered in this case. I propose to use a concrete example.

In the State of Alabama we have a seam of coal known as the "Mary-Lee" seam. The height of the seam varies from 5 ft. 5 in. to 9 ft. 5 in. The seam has a parting rock known as the "middleman," which varies in thickness from 12 to 24 in. The lower bench of this seam, or the coal under the middleman is usually, about 3 ft. in thickness. The method of extracting the coal is a simple one; the lower bench is taken out to a depth of about 5 ft., after which the parting-rock and the seam of coal above it are shot down. The rock is separated readily from the coal, the latter being loaded out first, and the rock disposed of afterward. The coal is all mined by pick on the room-and-pillar system, the rooms being driven double with a wide breast. The price paid for mining varies from 42½ to 52½c. per ton, the difference in price being due to the varying height of the coal in the lower bench. This seam of coal is mined extensively in Alabama, which indicates that such coal seams with heavy partings can be worked at a profit.



WORKING TWO SEAMS AS ONE

Formerly I had some experience in a seam of coal where the parting-rock was 5 ft. in thickness. The proposition was practically one of working two seams through a single set of openings or roads. The lower seam measured 3 ft., while the upper seam was 3 ft. 6 in., in thickness.

The accompanying sketch may assist, to some extent, in explaining the method of working these two seams as one. As the main roads are advanced, the work of taking out the coal is commenced in the lower seam. This coal is taken out under the parting-rock, on the longwall advancing system, as shown in the section marked *A*. This work is kept several yards in advance of the work in the upper seam, the distance being determined by the settlement of the overlying strata on the waste, which is packed solid.

The work of taking out the coal in the upper seam is performed in panels, on the retreating system of longwall. This is shown in the section marked *B*. A new panel is opened out by ripping the rock and taking down the upper coal, at a point a few yards behind the longwall face in the lower seam. The coal in the upper seam is then worked back on the retreating system until the entire panel is taken out.

By this means, the handling of the rock is entirely eliminated. The method has the further advantage that, owing to the settlement of the parting-rock or middleman, away from the coal in the upper seam, the latter requires no mining and is easily wedged down. The system was very successful in the production of cheap coal. I hope this interesting discussion will continue.

WILLIAM CROOKS.

Edgewater, Wylam, Ala.

Problems in Rescue Apparatus

Letter No. 1—I have read with interest the inquiry of W. H. Moore, COAL AGE, June 27, p. 1062. I fully agree with your statement that, "It is well nigh impossible to give exactly the reactions that take place between the hydrocarbons in the building up of the tissues of the body through the supply of oxygen to the lungs." In this connection, the following quotation from a first-aid book will be of interest:

This necessary purification of the blood is accomplished by the process of respiration, which may be defined as the function by which oxygen is absorbed into the blood and carbonic acid given off. To understand the necessity for the respiration process, it must be remembered that the leading feature of the chemical changes that go on in a living body is of the nature of a burning up or a combustion of the tissues, as shown by the production of bodily heat. To allow for this combustion going on and continuing, a certain amount of oxygen is absolutely required, just as an ordinary fire could not burn if no air or, in other words, no oxygen reached it.

But it is also a well established fact that there can be no combustion without the formation of waste products, one of the chief being carbonic acid. The tissues of the body are no exception to this latter law, and they freely give off car-

bonic acid as one of their waste products. Proof of this can be furnished by examining the blood in an artery going to, and in a vein coming from, any part of the body. From a pint of each of these varieties of blood, about half a pint of gas could be obtained by means of the air pump; but there would be a great difference in the composition of the respective gases. That obtained from the arterial blood would be made up of some nitrogen, a good deal of oxygen and a considerable quantity of carbonic acid; while that gotten from the venous blood would be composed of some nitrogen, but of only half the amount of oxygen and a much larger amount of carbonic acid. From this it is quite apparent that, as the result of nourishing the tissues, the blood has lost oxygen and gained carbonic acid. In fact, it is the presence of this large amount of the latter gas that constitutes the chief difference between arterial and venous blood and accounts for the difference of color between the two.

There is then going on in every part of the body a conversion of the red arterial into dark venous blood, owing to the tissues using up or breathing, as it were, the oxygen of the blood and pouring back into it the waste products of combustion in the form of carbonic acid and other substances. As long as this interchange of gases goes on regularly, everything works smoothly, but if it is in any way interrupted, and the blood that comes to the tissues contains no oxygen, then combustion ceases, the nutritive changes stop, there is a complete slowing if not an entire cessation of the machinery of the body, and death results.

I am inclined to believe that the 70 liters of oxygen, which Mr. Moore says are unaccounted for, must play an important part in sustaining life while wearing an apparatus, let it be the Fleuss, Draeger or Meco. I am not prepared to say what becomes of it, but I believe that the nitrogen, also, has its duty to perform just the same. It is true that the three types of apparatus named are expected to supply the wearer with two liters of oxygen per minute, which is $2 \times 61 = 122$ cu.in. According to tests made, a man wearing an apparatus and walking 4 miles per hour, requires 50 liters of air per minute, or $50 \times 61 = 3050$ cu.in. of air. Then, if we breathe at the rate of from 15 to 20, say 17 times per minute, we inhale $3050 \div 17 =$ say 179 cu.in. at each respiration.

Again, quoting from the first-aid book:

The full capacity of the lungs is 330 cu.in., in adults. In an ordinary respiration, from 20 to 30 cu.in. of air enters the lungs. This is called "tidal air"; and 200 cu.in. remains in the lungs after ordinary expiration. This is called "stationary air." In deep expiration, 100 cu.in. of air can be expelled from the lungs, and this is called "supplemental air." The remaining 100 cu.in. is the "residual air," and this cannot be expelled. By taking a deep inspiration, 100 cu.in. extra can be drawn into the lungs, making the full capacity of 300 cu.in. This is called "complemental air."

The above shows that 2 liters, or 122 cu.in. per min., or a little less than 8 cu.in. of oxygen per respiration, is supplied to the wearer of the apparatus while engaged in ordinary work; but apparatus wearers doing strenuous work require 50 liters of air per minute, or 179 cu.in. of air at each respiration. If they forget to turn on the bypass valve to replenish the volume of air, they at once experience that inability to draw a deep breath, begin to gasp and, in a few seconds, either fall or require assistance from others to enable them to stand and walk. This occurrence proves that they are not getting the necessary amount of air from the 8 cu.in. furnished by the 2 liters per minute. The purest air that we get is what Nature provides, which consists of about $^1/_5$ oxygen and $^4/_5$ nitrogen. This is why it is necessary to fill up the breathing bag with the outside atmosphere before turning on the oxygen in the apparatus. This provides the proper supply and mixture to start. If the breathing bag is too much distended release some of the exhaled air from the bag, by means of the release valve, until you breathe comfortably. This will also test the tightness of the apparatus and show that the release valve is in working order.

In reference to the moisture being absorbed by the caustic potash or caustic soda, I will say not all of it is absorbed, and that remaining I consider a dangerous element. This may be where some of the 70 liters of oxygen goes. I understand that water will hold in solution its own volume of CO_2, while nitrogen has no affinity or very little for either gas or water, serving only as a diluent. Be this as it may, some men yield more moisture than others. With the Draeger apparatus, I have found the saliva cup full and running over, besides enough water in the tube in front of the injector to interfere with the regular supply of air. This feature may be overcome by removing the saliva trap to the bottom of the regenerator, as is done on the improved or positive-pressure type. This trouble is also found both in the Meco or Westfalia, and Fleuss or "Proto." The caustic soda becomes nearly a liquid, after the apparatus has been worn an hour or more, and this is a source of great danger. I would like some advice as to the best method of overcoming this collection of moisture.

THOMAS ENGLISH,
Supt., Mine Rescue Station.
Springfield, Ill.

Graft in Labor Unions

I have read with great care and interest every article bearing on the working conditions of the present industrial movement, which seems to be rife in almost every coal-mining state at the present time. I have nothing to say against miners' organizations; I believe they can be made to prove helpful to every honest workman, if conducted properly by the officers in charge. This, however, is far from being the case.

I wish to relate a little of my past experience in the Westmoreland County strike of 1910-11. During that strike, I served as committeeman in the Ligonier Valley, Wilpen, Penn., Local No. 729, U. M. W. of A. This was the only local on the whole branch north of Ligonier. The companies who were affected by this strike are the following: Ligonier Coal Co., Peters; Columbia Coal & Coke Co., Old Colony; Marietta-Connellsville Coke Co., Marietta; Ligonier Diamond Coal & Coke Co., Seger Plains; and the Fort Palmer Coal & Coke Co., Ligonier.

Of the miners working on this branch, 95 per cent. are foreigners, and of these, only about 3 per cent. can read and speak English. On May 3, 1910, all the miners working on the branch were called out by strike agitators from Latrobe, who promised to see that the union was established; that the men would gain everything they wanted; and that the strike would not last long. They found the foreigners ready listeners; and, at that meeting, officers were duly elected.

The chairman of the Relief Committee knew nothing about the coal and coke business; but he knew how to keep his hands in the treasury and to get drunk. As was learned later, the graft in one day was from $50 to $70. After the reading of the treasurer's report at one meeting I asked for an explanation of how the money in the treasury was obtained. The chairman explained to me that the National Organization sends to every local $2.50 for each striker, $1 for his wife and 50c. for each

child. He explained, we pay three-fifths of this amount for relief and retain two-fifths for our own use; and added, "You know they are all dummies and know nothing of the transaction. You would be crazy not to grease your axle when you handle oil."

Investigation showed that the pages were torn from the ledger and the minute book; and that the treasurer's book showed only the full amounts. We succeeded in having new officers elected and I was appointed distributer of the relief funds. The following week the new officers went to Greensburg to have the books corrected at headquarters. At that time, it was found that the chairman had extracted from the treasury $600.75. I asked what could be done, and the reply was, "If he gave no bond, you can do nothing with him." An examination of the check book showed that one check for $8 endorsed by an organizer, was drawn in favor of another party, whom it never reached.

As I have pointed out, at another time, if coal companies would interest themselves to see that the locals in their vicinities are properly conducted; and that trade conditions are more fully explained and understood, there would be more coöperation on the part of the men and less labor troubles.

JOHN MAJER.

Listie, Penn.

A Longwall Proposition

Letter No. 6—Referring to the recent discussion of the longwall proposition, presented by Mr. Hartsuff, COAL AGE, June 6, p. 944, my experience of 30 years in longwall work in Scotland leads me to suggest the use of the "conveyor system" in this case. The advantage of that system would be that it would be possible to carry a much greater length of coal face and thus avoid the expense of maintaining so large a number of roads leading to the face as are necessary in the common longwall system.

The main roads, only, would require heavy brushing, and if the packwalls, say 20 ft. wide, are well built on each side of the road, these would probably be good for all time. The slate roof overlying the seam, and beneath the hard "sulphur binder," would probably furnish sufficient material for building the required roadpacks.

The principal features to be considered in the adoption of the longwall method of mining are the thickness of the seam, depth of overburden, character of top and bottom, and whether the work can be advanced continuously. The main point, in this system of working, is to take out all the coal anl allow the top to settle down solid on the packwalls and waste.

JOHN SHEPHERD.

Glencoe, Ohio.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

EVOLUTION

The word "evolution" means an unrolling or unfolding. The process is the reverse of involution.

Involution is finding the product of equal factors.

Evolution is finding the equal factors of a given number. In the latter case (evolution), the given number is a certain power of another number called the **"root."**

Roots of Numbers—The number of equal factors required is the **"index"** of the root.

The extraction of a root is indicated by the character $\surd$ called the **"radical,"** written just before the given number. The index, denoting the root required, is a small figure written above and before the radical. For example, $^2\surd$, $^3\surd$, $^4\surd$ written before a number, indicate, respectively, that the second, third or fourth root of the number is required.

As in involution, the first root of a number would be the number itself; while the second root is commonly called the **"square root"** and the third the **"cube root"** of the number. When the square root is desired, it is indicated by the radical sign alone, the index figure 2 being omitted. Thus, $\surd 4$ indicates the second or square root of 4 is to be extracted; $^3\surd 8$ indicates the cube root of 8; $^5\surd 9$, the fifth root of 9; etc., etc.

It is customary to write a bar over the number whose root is to be extracted; thus, $\surd 144$ indicates that the square root of 144 is to be extracted.

To Find a Root by Trial—The root of a number can always be found, to any desired degree of approximation, by the successive multiplication of trial factors.

Example—Find, by trial, the following roots: (a) $\surd 81$; (b) $^3\surd 216$.

Solution—(a) By trial, $7 \times 7 = 49$, low;
$8 \times 8 = 64$, low;
$9 \times 9 = 81$. Hence, $\surd 81 = 9$.

(b) By trial, $5 \times 5 \times 5 = 125$, low;
$7 \times 7 \times 7 = 343$, high;
$6 \times 6 \times 6 = 216$. Hence, $^3\surd 216 = 6$.

In evolution, it is important to note the following observations:

1. Beginning at the units place, divide the number into periods of as many figures each as there are units in the index. In a decimal, the division begins at the decimal point, the periods of the integer being counted to the left and those of the decimal to the right of this point. The left-hand period may contain fewer figures than the index denotes; but the right-hand decimal period must always be completed, by adding ciphers, if necessry.

2. The root of a number will always contain as many figures as there are periods in the number, and the number of decimal figures of the root will be equal to the number of decimal periods of the number.

The Coal Age Pocket Book

Example—Find by trial the cube root of 35,208.25.

Solution— $^3\surd 35{,}208.25 = {}^3\surd 35{,}208.250$

Observe, each period of the number represents a figure of the root. Therefore, find the greatest cube contained in the first period on the left and its root will be the first figure of the required root; thus

$3 \times 3 \times 3 = 27$, low; and $4 \times 4 \times 4 = 64$, high.

Then the first figure of the root is 3. In the same manner, find the second figure, by considering the first two periods of the number and ascertaining the greatest cube contained therein. The root will evidently be a number between 30 and 40. Thus, by trial,

$33 \times 33 \times 33 = 35{,}937$, high;
$32 \times 32 \times 32 = 32{,}768$, low;

The first two figures of the root are therefore 32 and these form the integer of the root. In the same manner to find the third figure which is the first decimal figure of the root, consider the three periods of the number and proceed thus,

$32.8 \times 32.8 \times 32.8 = 35{,}287.552$, high;
$32.77 \times 32.77 \times 32.77 = 35{,}190.814$, low;
$32.78 \times 32.78 \times 32.78 = 35{,}223.040$, high.

Therefore, $^3\surd 35{,}208.25 = 32.77+$, which is correct to two decimal figures.

Square Root, Direct Method—

Rule—Beginning at units place, divide the number into periods of two figures each. Observe the greatest perfect square contained in the left-hand period, and write its root as the first figure of the required root. Subtract the square of this figure from the first period, and to the remainder annex the second period, for a dividend.

Divide this dividend exclusive of the last figure, by twice the root just found. Write the quotient for the second figure of the root, and annex the same figure to the trial divisor. Multiply the divisor so increased by the said second figure of the root and subtract the product from the last dividend. To this remainder annex the third period for a new dividend.

Again, double the root for a trial divisor and proceed as before till all the periods are brought down. If there is still a remainder, the process may be continued by writing a decimal point in the root and annexing two ciphers to the last remainder. The work may thus be carried to any degree of approximation desired.

Example—(a) $\surd 274{,}576$ (b) $\surd 1.4161$

Solution—

```
(a)     27 45 76(524          (b)      1.41 61(1.19
        25                             1
      -----                          -----
 10 2)  2 45                    2 1)    41
        2 04                            21
      -------                        -----
104 4)  41 76                   22 9)  20 61
        41 76                          20 61
```

Inquiries of General Interest

Electrical-Power Transmission

After a considerable discussion of the following question, which has given rise to different opinions in reference to the correct answer, it has been agreed by the parties interested to submit the question to COAL AGE for solution, and to be governed by its decision. The question is as follows:

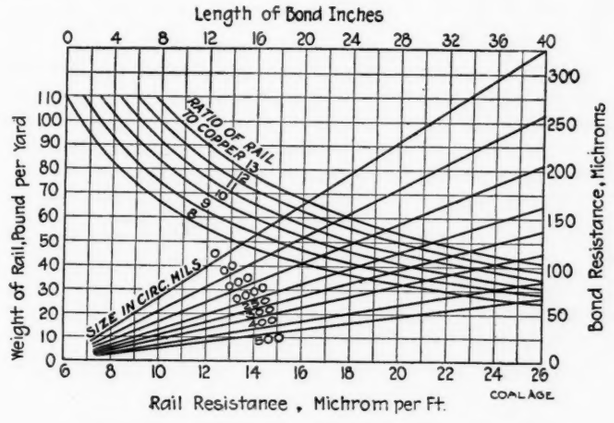
Ques.—A 50-hp. blowing fan, located one-half mile from the power house, is to be driven by a 250-volt motor. The generator at the power station delivers 275 volts. (a) What size of wire should be used to connect the motor and generator? (b) At 20c. per lb., what will be the cost of T. B. W. P. copper wire, for this job?

JOHN J. CRANE.

Connerton, Penn.

The electric power required to drive a 50-hp. fan is $50 \times 746 = 37{,}300$ watts. The current required to operate a 250-volt motor so as to supply this power is $37{,}300 \div 250 =$ say 150 amp. Since the generator at the station delivers 275 volts, and the motor requires only 250, there is a permissible line drop of $275 - 250 = 25$ volts.

The accompanying combined diagrams, adapted from the publications of the Ohio Brass Co., furnish a convenient method of determining the electrical resistances of steel rails of different weights per yard and of compressed-terminal bonds of different size and length. The lines curving downward from left to right are the resistance curves for different "rail-to-copper ratios."



RESISTANCE DIAGRAM FOR BONDED RAILS

In using this diagram to find the resistance per foot in microhms for any given weight of rail, follow the horizontal line corresponding to the given weight per yard of rail shown by the scale on the left of the diagram, until this line intersects the curved line of the proper rail-to-copper ratio. From this intersection, follow the vertical line downward to the scale at the bottom of the diagram, which gives the microhms of resistance per foot of rail. For example, assuming a 40-lb. rail having a rail-to-copper ratio of 12 : 1, the resistance per foot of rail, as found by the diagram, is 25 microhms, or 0.000025 ohm. If the rails are 30 ft. long, the resistance of each rail is $30 \times 0.000025 = 0.00075$ ohm.

Now, assuming a 24-in., 4-0 bond, follow the vertical line marked 24 on the scale at the top of the diagram downward to its intersection with the diagonal line marked 0000, and from this intersection follow the horizontal line to the scale on the right, which will give the required resistance of the bond in microhms. In the present case, the resistance of the 24-in., 4-0 bond is 100 microhms, or 0.0001 ohm.

Adding this resistance for a single bond to that for a single 30-ft. rail, the total resistance for a bonded rail is $0.00075 + 0.0001 = 0.00085$ ohm. The number of rails in ½ mile is $2640 \div 30 = 88$. The bonded rail resistance, in this distance, is then $88 \times 0.00085 = 0.0748$ ohm. This is the resistance for a single line of rail. The track resistance (two rails) for the same distance is one-half that for a single rail, or 0.0374 ohm.

Now, multiplying this resistance by the current (150 amp.), the voltage or pressure absorbed by the rails of the track, on the return end of the circuit, is

$$E = CR = 150 \times 0.0374 = 5.61 \text{ volts.}$$

Then, allowing for possible loss of pressure through imperfect connections at the rail joints, and assuming, say six volts on the return end of the circuit, the permissible drop of pressure in the trolley line is $25 - 6 = 19$ volts.

Finally, the size of trolley wire required to transmit a current of 150 amp., with a line-drop of 19 volts, is then calculated as follows:

$$\text{Circ. mils} = \frac{21.6 \times 2640 \times 150}{19} = \text{say } 450{,}200$$

The weight of a triple-braid, insulated copper wire of this capacity, as taken from manufacturers' tables, is 1724 lb. per 1000 ft., or 1.724 lb. per ft. At 20c. per lb., one-half mile of this trolley wire will cost $2640 \times 1.724 \times 0.20 = \$910.27$.

Wind Pressure

What is the best method of estimating the pressure exerted on a flat surface by a wind traveling at a certain velocity, say 60 miles per hour?

ENGINEER.

Denver, Colo.

From experiments performed by the U. S. Weather Bureau, for the purpose of determining, if possible, the exact relation existing between the velocity and pressure of straight, surface winds, it was found that this relation is best expressed by the formula

$$p = 0.004 \frac{B}{30} v^2$$

Thus, for a velocity of $v = 60$ mi. per hr., when the barometric pressure is $B =$ say 28 in., the pressure of a straight wind, normal to a flat surface, is

$$p = 0.004 \frac{28}{30} 60^2 = 13.44 \text{ lb. per sq.ft.}$$

Examination Questions

Miscellaneous Questions

(*Answered by Request*)

Ques.—In case of an explosion, at a shaft mine in your district, where many workmen are yet in the mine, and you were the first person on the ground after the accident, how would you organize and conduct the work of rescue?

Ans.—Until someone higher in authority underground than yourself arrives, call for volunteers; have the foremen and all firebosses notified at once; note the effect of the explosion by the indications observable at the upcast or downcast shafts, and inspect hurriedly the ventilating apparatus, which, if damaged, must be repaired as quickly as possible; arrange for the speedy equipment of rescuers with safety lamps, tools, supplies, etc.; and, having instructed the regular rescue and first-aid corps to proceed, if possible, into the mine by the most accessible opening, follow this with the organization of other rescuers chosen from among the most competent and experienced of the volunteers.

The entrance of the mine will depend wholly upon conditions, but, in general, must be effected through the intake openings, following the intake air current and making such hasty repairs as are possible and necessary to conduct the air current into the mine. The force of volunteers should be divided into two gangs, the more experienced men advancing to make the necessary exploration and repairs, while the others are employed to furnish the first party with any needed supplies and perform such other services as are desired. The mine should be explored thus in sections, taking special precaution to extinguish any fires that may exist after the explosion and to properly control the ventilating current until each section is reported safe.

Ques.—What are the advantages and disadvantages of the different kinds of mining machines, with respect to health, safety and economy?

Ans.—There are two general types of mining (coal-cutting) machines; namely, those driven by compressed air and electricity, respectively. Compressed-air machines have the advantage of furnishing a certain amount of fresh air at the working face, through the exhaust of the machines. They have the disadvantage of requiring a more permanent and less flexible installation of a pipe system to conduct the air to the working face. Electrical machines possess the advantage of having a light flexible installation through a system of wires by which the current is conducted to the working face. This system possesses the disadvantage, however, of possible danger to men and animals through contact with live wires or the ignition of gas when present, by the short-circuiting of wires or sparking of switches and other connections. Both of these systems possess the disadvantage of being interrupted by a possible fall of roof breaking the power line. In respect to economy, the question depends wholly on conditions in the field and whether a compressed air or electrical installation is already in use in the mine.

Ques.—If an air current of 20,000 cu.ft. per min. is circulated in an airway by 3.15 hp. and this current is increased to 40,000 cu.ft. per min., what will be the water-gage reading?

Ans.—The question is not complete, since it fails to state the cause of the increase of circulation from 20,000 to 40,000 cu.ft. per min. This increase in quantity may be due to an increase of *power*, in which case the pressure and water gage will vary as the square of the quantity; or, the power remaining the same (3.15 hp.), the increase in circulation may be due to the short-circuiting of the air current or the splitting of the air into two currents. We have, therefore, two cases, as follows:

1. When the power is increased to double the quantity, the water gage increases as the square of the quantity, and becomes four times the original water gage, for the same conditions in the mine.

2. If the power remains constant and the air current is short-circuited or split, the water gage varies inversely as the quantity of air in circulation. In this case, the air being doubled, the water gage will be reduced to one-half the original gage.

Ques.—What are the requirements of the law regarding measuring the ventilation, and how can the air current be measured? *Anthracite, Penn.*

Ans.—Once each week, the inside foreman, or his assistant, must measure the quantity of air in circulation with an anemometer or other efficient instrument, such measurement to be made at the inlet and outlet airways, also, at or near the face of each gangway and at the crosscheading nearest to the face of the inside and outside chamber or breast where men are employed. A report of these measurements must be sent to the inspector before the twelfth of each month, for the preceding month, together with a statement of the number of persons employed in each district of the mine.

The reading of the anemometer, divided by the number of minutes the instrument was exposed to the current, gives the velocity of the air in feet per minute. If care has been taken to obtain an average reading for the entire section of the airway, the area of this section multiplied by the indicated velocity of the current gives the quantity of air passing in feet per minute.

Ques.—Name two explosives in common use in blasting coal in gaseous mines.

Ans.—The permisible explosives as classified by the Federal Bureau of Mines will be found in Miner's Circular No. 6, pp. 15-16. Of these, perhaps the ones in most common use, are monobel, Nos. 2 and 3, and carbonite No. 1. Monobel No. 2 has about the same strength as a 40-per-cent. dynamite cartridge of the same size, but is much slower in its action, which feature adapts it to the mining of coal. This powder is practically without smoke or fumes and belongs to the ammonium-nitrate class of explosives. Carbonite No. 1 belongs to the nitroglycerin class of explosives and has about the same strength as monobel No. 2.

Book Reviews

PRACTICAL COAL MINING. By leading experts in mining and engineering under the editorship of W. S. Boulton, professor of geology, University College, Cardiff, Wales. 6 vol. In all 1197 pp. and 14 pp. of index. Well illustrated. 6¾x10⅛ in. Cloth bound. Also a booklet containing "manikin" of a winding engine 8x11¼ in. Paper bound. The Gresham Publishing Co., James Wolffsohn, controlling agent for U. S. sales, 11 Broadway, N. Y. Price, $12.

The reader will probably say when reading the above description: Why cannot we have a good book on coal mining published in America which will sell for a price equally reasonable? Unfortunately, so far no book of reasonable price has appeared from the press of this country, though in many ways a book published in America for Americans would better meet the demand of the market.

Yet we are far from denying that a foreign book has the advantage of a new viewpoint, and a man who is broad enough to comprehend the similarity of the problems and to differentiate them when they are unlike will be able to learn a great deal from this treatise. It must be acknowledged that while it is a foreign book, it is largely with such publications that it must compete, and for many years our mining libraries have contained at least as many English books as American.

The book has the merits of authority and modernity. The date 1913 on the title page is borne out in the text, though we think the remarks on the electric lamp by James Ashworth make no attempt to be abreast with the times. The reader will hardly recall the Trouvé, Sussmann, Bristol, Headland and Coad lamps which occupy the whole electrical field in Ashworth's treatment.

In Vol. I "The Geology of the Coal Measures" is acceptably treated by the editor himself. The illustrations are all from British examples, but most of the conclusions are broad enough to have a trans-Atlantic value. The account of the British fields is short and the author wastes no time in describing the continental coal measures. The "Composition and Analysis of Coal," by C. A. Seyler, public analyst for Glamorgan, Carmarthen, Pembroke and Swansea, follows.

BRITISH ANTHRACITE

His classification of coal is far more minute than is customary here. There are no less than 15 different divisions for coal varying from ortho-anthracite to lignitious coal. This first has from 3 to 8 per cent. of volatile matter, and Mr. Seyler says that the coal corresponds to the true anthracites of South Wales and America. The volatile matter in American anthracites roughly runs between 1.25 and 9 per cent., so it is clear that South Wales has coal which can be fairly designated as anthracite, according to even the narrowest interpretation of the term. The ortho-anthracite coals mentioned in the list are Capel Ifan, Trimsaran Green seam, Ynisgeinon, near Llanelly; Pwllfaron, near Neath; Cwmclick Upper or Penygraig seam; Pwllfaron 18-ft. seam, and the Trimsaran Gregog seam.

But while we, in America, agree with Mr. Seyler's definition of anthracite, we shall find it hard to call all pure coal containing less than 84 per cent. total carbon a lignitious coal. The Bruceton coal, according to this classification, would be bituminous, it is true, but the author would qualify it as per-para-bituminous. Not one analysis is given of either coal or ash. Nothing is said about sulphur. Most English books are incomplete in this regard as compared with American, but we cannot recall any as silent on this subject as is this one.

"Trial Borings" is well treated by H. F. Bulman, and "Shaft-Sinking," by Henry Louis, professor of mining, Armstrong College, Newcastle-on-Tyne, England. The latter is complete in all branches of the subject. "Breaking Ground" also falls to H. F. Bulman, and this subject covers explosives, shotfiring, drilling, the driving of rock headings and the mining of coal.

ENGLAND ALSO HAS SUBSIDENCE PROBLEMS

Methods of working and timbering are described by E. H. Robertson, professor of mining engineering, Calcutta, India. The description of roof strains is quite incomplete. However, we are glad to see the writer disagrees with the singularly ill-informed views of M. Fayol and M. Callon. It is interesting to note also that he states that: "Many towns in the United Kingdom have been undermined either wholly or partially. In Northumberland, on the west side of Newcastle-on-Tyne, 50 per cent. of the coal was extracted, while at Chorley, in Lancashire, 75 per cent. of the underlying coal at a depth of about 300 ft. has been worked. Many other instances, such as South Shields, Barnsley and Oldham, might be given."

"Haulage" is treated by G. R. Thompson, professor of mining, University of Leeds, and "Winding," that is, hoisting, by Charles Latham, professor of mining and mining engineering at Glasgow University. W. E. Lishman treats on "Pumping" and dams. Here are treated both rotary and air-lift pumps. "Ventilation" falls to the well known H. W. G. Halbaum, and he treats it in an historical and theoretical way. We are disappointed to see the Waddle, Walker, Shick and Capell fans alone treated and not in an adequate way. Nothing is said of the multiblade types. W. E. Lishman discusses "Transmission of Power in Electricity—Steam, Compressed Air and Hydraulics," and James Ashworth, whom our readers all know, the subject of "Lighting." While not strictly up to date, this department will be found fully as interesting as Mr. Ashworth's other writings.

No less a person than W. Galloway, formerly an inspector of mines, writes on "Colliery Explosions and Rescue Appliances." H. F. Bulman deals with mining law under the head of "Mineral Holdings," while "Mine Surveying" falls to L. H. Cooke, who treats the subject at considerable length. S. Warren Price, lecturer on mining at University College, Cardiff, discusses "Preparation of Coal for the Market," and some of the English methods of cleaning and screening are well worthy of investigation. W. Galloway takes up the consideration of "Coking and the Recovery of By-products." Nothing shows more clearly how much further British practice has advanced than ours than the fact that Mr. Galloway entirely ignores the beehive and belgian types of ovens, and nobody makes good his omission. H. Stanley Jevons, lecturer in economics and political science at University College, Cardiff, with David Evans, contributes "Economics of Coal," in which is treated supply and demand, opening of mines, profits, marginal productivity, size of operation, interest, wages, sliding scales, conciliation boards, wage scales, abnormal places, the strike of 1912, colliery legislation and its effects, housing, price regulation, marketing and shipping.

The chart we have called a manikin is a dissected illustration of a winding engine, prepared in a manner similar to the reproductions of the human body for studies in elementary physiology.

INTERNATIONAL CONFERENCE OF MINE-EXPERIMENT STATIONS. Compiled by Geo. S. Rice. Bulletin 82 of the Bureau of Mines. 5⅞x9⅛ in. Paper cover.

This report gives not only an account of the conference but several interesting and hitherto unpublished papers read before the meeting. For instance there is the statement of Horace C. Porter that "Experiments in which powdered coal was heated to 100 deg. C. (212 deg. Fahr.) in a current containing 50 per cent. oxygen have proved that the process of absorption of oxygen by coal (not producing carbon dioxide) is exothermic" that is heat giving. "Furthermore, the carbonaceous material absorbs oxygen more rapidly than does pyrite, this showing that oxidation of pyrite is not the principal factor in spontaneous combustion. Coal subjected to this action, the absorbing of oxygen without forming carbon dioxide, decreases in calorific value which is another evidence, as Taffanel has pointed out, that the action is exothermic."

He then goes on to show that coal artificially dried will rise rapidly in temperature when it takes up water. A few drops of water added to coal dried at 212 deg. Fahr. raised its temperature 23.4 deg. Fahr.

J. K. Clement stated that carbon dioxide deadened flame more than nitrogen. When 95 per cent. of the nitrogen of ordinary air is replaced by the dioxide of carbon, no mixture of such "air" and natural gas would explode in a gas pipette. This he ascribes to the greater specific heat of carbon dioxide which is 10.6, whereas that of nitrogen is only 7.2. There are several other interesting papers by G. S. Rice, L. M. Jones, J. K. Clement, H. C. Porter, J. W. Paul, H. H. Clark, A. C. Fieldner, G. A. Burrell, C. Hall and O. P. Hood.

Coal and Coke News

WASHINGTON, D. C.

The Interstate Commerce Commission has sent to the Senate during the past few days a reply to the resolution of some time ago in which Congress requested an investigation of the relation of common carriers to coal and oil and the transportation thereof. This particular report deals with the relations of trunk lines and their officials to coal operations in the State of Illinois and incidentally in the State of Indiana.

Answering the first element in the resolution, namely, whether and what carriers are interested in the coal they transport, the commission says that the Atchison, Topeka & Santa Fé owns the bonds of the Toluca Coal Co. which owns about 12,000 acres of coal lands and operates one mine with a daily capacity of about 1500 tons; that the Chicago & Northwestern Ry. owns the entire capital stock of the Superior Coal Co. and of various others producing about 2,000,000 tons of coal annually, the majority thereof being sold to the Northwestern.

The Chicago, Indianapolis & Louisville Ry. owns practically all of the capital stock of the Chicago & Indianapolis Coal Co. and is interested in various other coal concerns. The Missouri Pacific controls the capital stock of the Western Coal & Mining Co. which ships its coal over this same road. The Chicago, Milwaukee & St. Paul Co. owns the capital stock of the St. Paul Coal Co. which operates two mines yielding about 660,000 tons a year, the bulk of this being sold to the railway. The Illinois Central Railroad Co. indirectly owns the stock of the Madison Coal Corporation, which operates some six mines with a daily capacity of 10,400 tons.

Other railway companies and their coal ownership are described in like manner at great length.

In connection with the second part of the inquiry, namely, whether any of the officers of the roads or any persons charged with the duty of distributing cars to shippers are interested in coal operations, the commission finds that on the Toledo, St. Louis & Western, several officers were formerly interested in coal companies but that sundry of them have recently disposed of their stock. The Chicago Junction R.R. Co.'s president owns the stock of the Grant Coal Mining Co.

On the Missouri Pacific and St. Louis & Iron Mountain it was found that an indirect connection existed between the roads in question and the "Big Muddy" Coal & Iron Co. Three traffic officials of the Southern Railway Co. own small blocks of the securities of the Southern Coal & Mining Co. Possibly the most extensive treatment is given to the relations between the New York Central and the coal mines. On this the report says:

W. C. Brown and certain other officials of the New York Central lines were active in the promotion of two companies operating in Saline County—the Saline County Coal Co. and the O'Gara Coal Co.—and formerly owned large blocks of the securities of those firms; most of these persons, however, have now disposed of their holdings. The Saline County Coal Co. was incorporated in April, 1907, with a capital stock of $375,000. It later issued bonds to the amount of $300,000.

In October, 1908, the bonded indebtedness of the Saline County Coal Co. was increased to $1,000,000, of which there is said to be now outstanding $574,000. In July, 1910, the capital stock was increased to $1,250,000 of which there is said to be now outstanding $689,125. According to the record, the Saline County Coal Co. holds about 7000 acres of coal lands and mineral rights, about 80 per cent. of which is leased from the Cleveland, Cincinnati, Chicago & St. Louis Ry. Co. as indicated hereinbefore. The coal company owns three mines, one of which has been worked out and abandoned; the other two were constructed with the proceeds of the later issues of bonds and stocks and are located on property leased from the railway company and others.

The Saline County Coal Co.'s production for shipment is said to be from 80 to 100 cars of coal per day, part of which is sold to the New York Central Lines for locomotive fuel and the remainder commercially. It is understood that this company has recently acquired the control of the Harrisburg Southern Coal Co., operating a mine near Eldorado, in the State of Illinois.

The O'Gara Coal Co. was incorporated in July, 1905, and took over for development properties consisting of coal lands and mines which had been secured under options several months previously by Thomas J. O'Gara and others. The company was capitalized at $6,000,000 and later issued bonds to the amount of $3,000,000. It holds at present by lease and ownership more than 30,000 acres of coal lands and mineral rights in the Harrisburg district. It owns about 14 mines, 2 or 3 of which are now worked out and closed down. The company is said to produce for shipment from 200 to 300 cars of coal per day, a large part of which is sold to the New York Central Lines for locomotive purposes and the balance to other carriers and industries in Chicago, the West, and Northwest. In September, 1913, the O'Gara Coal Co. went into voluntary bankruptcy, and receivers in the persons of Thomas J. O'Gara and Fred A. Busse were appointed by the court to administer its affairs.

Additional Questions Discussed

The Commission goes on to discuss the various additional questions presented to it, such as the existence of contracts or conspiracies in restraint of trade to which coal carriers are parties and points out that the United States Steel Corporation controlled large mineral rights and railway communications therewith in Illinois.

As to the requirement that it report how the mines are treated in the distribution of cars the Commission says:

The problem of equitable car distribution is composed of two factors—(1) The ratings of the mines and (2) the actual distribution of equipment in accordance therewith. The purpose of a carrier in fixing ratings for mines on its lines is to determine the basis upon which each shall share in the equipment available for coal loading during the periods when the supply of cars is insufficient to meet all requirements. At such times it becomes necessary to place some restriction upon all the mines, and in order to do this impartially the practice of rating them and distributing the available equipment pro rata, on the basis of such ratings, has been adopted.

Many of the Illinois roads have published rules governing the ratings of mines and the distribution of cars among them, and practically all have some definite plan of handling car-shortage situations. These rules and plans, however, are not uniform on the several roads; on the contrary, each has endeavored to solve its own problem independently. A great deal of dissatisfaction has been felt by mine operators with the various systems of ratings and distribution, and numerous allegations of unfairness and discrimination have been made.

The result has been considerable litigation before this Commission and the courts. Generally speaking, Illinois roads rate the mines served by them on the basis of commercial capacities of the mines. If fair and correct methods of determining the relative capacities of mines are used, this may afford a reasonably equitable basis for rating, but, unfortunately, this has not always been the case.

A Radical Change in the Clayton Bill

In reporting the Clayton trust bill, on July 22, to the Senate, the Judiciary Committee of that body made, as the new draft of the measure shows, an important change in the form of the bill sent over by the House of Representaties, insofar as relates to mining. The Committee has left out of the bill entirely Section 3 which read as follows:

That it shall be unlawful for the owner, operator, or transporter of the product or products of any mine, oil or gas well, reduction works, refinery, or hydroelectric plant producing coal, oil, gas, or hydroelectric energy, or for any person controlling the products thereof, engaged in selling such product in commerce to refuse arbitrarily to sell such product to a responsible person, firm, or corporation who applies to purchase such product for use, consumption, or resale within the United States or any Territory thereof or the District of Columbia or any insular possession or other place under the jurisdiction of the United States, and any person violating this section shall be deemed guilty of a misdemeanor and shall be punished as provided in the preceding section.

Speaking of the reason for striking out this section, the Judiciary Committee says: "It would primarily deny freedom of contract to one of the parties, and consequently be of doubtful constitutional validity. Passing from this consideration, the Committee believes that such an enactment, which would practically compel owners of the product named to sell to anyone or else decline to do so at the peril of incurring heavy penalties, would project us into a field of legislation at once untried, complicated, and dangerous."

Little Progress in Investigation

In spite of continuous hearings during the past week, before the Senate Committee investigating the conditions of southern coal traffic with a view to ascertaining how far a so called trust exists in that trade, comparatively little progress has been made.

B. L. Dulaney, an independent coal operator of Bristol, Va., has made a long series of charges regarding the alleged policy of the Southern Ry. in connection with the handling of coal originating in the Southwestern and Appalachia fields. These charges have been answered by various persons, including Fairfax Harrison, president of the Southern Ry. and others, it being a claim that the Southern has not had any hand in driving individuals out of business or in

hampering one set of coal dealers in order to promote the interests of another.

One of the main points made by witnesses against the Southern Ry. was that directors of that road were also directors in other enterprises which did business with the road, particularly in coal enterprises of various kinds. This relationship has not been denied, but the claim has been strongly urged that none of the persons named have exerted an undue or improper influence in regard to the Southern's treatment of shippers and that all of them without exception have carefully recognized the line of division between their functions in connection with the road and their interests in other directions.

The whole investigation has had a tendency to drag and prediction is now made that little will come of it except the usual formal report with some reference to the undesirability of interlocking directorates and possibly criticism upon which the investigation seems to have disclosed some sidelight.

PENNSYLVANIA

Anthracite

Dunmore—Residents of the Green Ridge section of Dunmore are assured of surface support through an amicable settlement on July 23 of the appeal of Colonel George Sanderson and others, owners of the coal, from the assessment placed upon the mineral by the county commissioners. With counsel agreeing, Judge Newcomb made an order reducing valuation from about $60,000 to the nominal figure of $25,000. The order reads that the coal now in the tract is not to be disturbed, and that if in later years it is removed, those taking it from the ground must provide sufficient artificial support for the surface.

A petition was recently filed asking for the dissolution of the Nay Aug No. 4 Coal Co. This firm was organized in March, 1908, with offices in Dunmore. The petition states that the company has no debts, liabilities, or assets, and has all state taxes fully paid.

Carbondale—Estimating that at least 100 tons of coal is stolen daily and determining to put a stop to this practice, officials of the Delaware & Hudson Co. have issued orders for the road detectives to keep close watch on persons who pick coal from cars stored in yards along the line. It is said that the company is not opposed to coal picking from the ground, but of late inroads have been made on loaded cars, and this the officials are determined to stop.

Pottsville—The Philadelphia & Reading Coal & Iron Co. has caused great surprise by raising the price of coal in this part of the anthracite region 11 cents per ton, with a statement that another raise may be made shortly. As this region has never been allowed the spring reduction of 50 cents per ton, it has never heretofore figured on the monthly increase of 10 cents. The public is unable to understand the attitude of the mining company. It is believed, however, that the Reading is making this advance in price at the mines, anticipating a decision favoring lower freight rates on anthracite to Philadelphia.

Bituminous

Pittsburgh—Coal companies which have been making shipments to the lakes for Northwest markets under a reduced rate for some weeks past were recently notified that the last of the large coal storage docks on the upper lakes have been filled up, and further shipments to that point would have to cease until the congestion diminishes. According to reports, this change will not be possible before the middle of August when the grain movement from the Northwest starts.

Somerset—The second annual Somerset County Miners first aid meet under the direction of the industrial committee of the state Young Men's Christian Association was held July 25, in charge of George B. Landis, of Harrisburg, and A. W. Harris, of the U. S. Bureau of Mines. Prizes for the various events were as follows:

One-man event, Ralphton team of the Quemahoning Coal Co. Two-man and three-man event, Myersdale team, No. 1 of the Consolidation Coal Co. Team event, first prize, Orenda No. 2 team, of Somerset Smokeless Coal Co. Second prize, Jerome No. 2 team, of the Jenner Quemahoning Coal Co.

Ralphton—The contest between the Jenner Brewing Co. and the Quemahoning Coal Co. over the selling of beer in this town, which is owned by the coal company, is to be taken to court. A mine foreman was arrested several days ago while carrying out the company orders to prevent the delivery of the brewing company's product in the town. It is claimed that a similar case has already been decided in favor of the seller in a contest between a merchant of Fayette County and a coal company which owned a town there. It is said that this case, if it goes against the coal company, will have the effect of opening all the coal towns in Somerset County to merchants, brewers or others who may desire to sell articles, regardless of the fact that the coal companies may own the land, streets, houses and industries of the community. The case will be watched with considerable interest because of the issue involved.

Du Bois—A meeting of mine foremen, assistant mine foremen and fire bosses has been called for July 28, at which time endeavors will be made to organize a Mine Officials' Beneficial Corporation. The object is mutual benefit through sick, accident and death payments to its members. Only mine officials will be eligible for membership. At present mine officials are without benefits, other than those provided by the coal companies.

Ache Junction—The new plant of James H. Hoover will consist of 100 beehive ovens of the large pattern equipped with mechanical drawers and loaders. His present plant, which is known as Hoover, consists of 74 ovens.

Rockwood—The big wooden frame tipple of the Bradenburg Coal Co. was totally destroyed by fire on the morning of July 20, entailing a loss of several thousand dollars. The cause of the fire has not been ascertained.

WEST VIRGINIA

Matewan—The Stone Mountain Coal Corporation with headquarters at Roanoke is installing at its Marvin mines Nos. 1 and 2 the weigh check system, which will be in operation in the course of a short time. These will be the only mines in this part of the state using the mine scales, and operators are much interested to know what the final outcome will be.

Charleston—After being idle since June 1, the Winifrede Coal Co. has resumed operations. Since the strike was settled throughout the Kanawha field about two weeks ago, there has been a shut-down at the Winifrede mines on account of failure to have sufficient orders to justify operations. About 400 men will be employed at Winifrede.

Kingwood—Mine No. 4 of the Elkins Coal & Coke Co. recently resumed operations after a shut-down of several months. The resumption of work at this mine is an indication of the picking up of the coal market, which has been on a bad slump for several months past. A gradual increase is expected from now on. When running full No. 4 mine gives employment to about 200 men, approximately half of which are at present employed in this operation.

ALABAMA

Birmingham—Thirty-three out of 59 miners standing examination the past week for first and second class certificates and for fire boss positions passed. J. F. Young of Palos, Ala., won the highest mark, this being 97. He was standing examination for fire boss. E. M. Owens of Pratt City received the highest mark for first class certificate ,receiving a grade of 92½. Mr. Owens is at present an engineer of the Tennesee Coal, Iron & R.R. Co. The class was the largest ever handled by the Examining Board.

KENTUCKY

Barbourville—Full time operations are the rule at most of the mining plants in the southeastern section of Kentucky, according to the leading operators hereabouts, and it is expected that the next few weeks will see operations active. Harlan County has advanced to a front rank in the list of coal producing localities as a result of numerous prosperous mining plants. The largely increased output of the Harlan mines is taxing the facilities of the Louisville & Nashville R.R. to handle the coal turned over to it for transportation.

OHIO

Zanesville—A $2,000,000 merger in the coal, sand and brick business was completed here recently, the companies in the deal being the Northern Coal Co., the Monitor Coal Co., the T. B. Townsend Brick & Contracting Co., and the L. K. Brown Sand Co. The new concern will be known as the Burton-Townsend Co. The capacity of the operating plants will be quadrupled. The company owns 300 acres of coal lands and has options on several thousand more.

Columbus—Although the Lloyd conservation bill, passed in the recent one-day session of the legislature, gives the state exclusive ownership and control of all minerals on school lands, it is announced by State Auditor A. V. Donahey that there is no intention to attempt to operate oil or coal properties. The enactment of the law was followed by rumors that the state would take possession of and operate coal and oil lands, but this is not to be done. Instead, matters will be adjusted with persons now operating on state land on a royalty basis, which is expected to prove mutually satisfactory.

INDIANA

Linton—Eighty men at Vandalia mine No. 9 recently went on strike and the mine closed down. The company desired to put two men in entries and the miners refused to allow more than one.

Terre Haute—The Fauvre Coal Co., Indianapolis, has leased its mining property west of this city to the recently incorporated Sunbeam Mining Co., owned by the Harder and Hafer interests of Chicago and James McClellan, the veteran operator of Brazil. The lease covers 823 acres and a mine. It runs for ten years. The Fauvre company will receive a royalty of 3 cents per ton on mine-run and 5 cents on 1¼-inch and above, its royalty not to amount to less than $3000 a year.

ILLINOIS

Virden—Mine No. 2 of the Montour Coal Co., located at Virden, has been closed for repairs.

Andrews—The Cora Coal Co. has resumed operation at its mine located at Andrews, near Springfield. The top works of this mine were burned March 17 last and an up-to-the-minute steel equipment with shaker screens has been erected capable of loading five sizes at the same time.

Springfield—The Springfield Mining Co. has opened up the No. 5 mine, which has been idle since last winter, when the above named company went into the hands of a receiver. There are rumors that a new escapement shaft will be put down in the near future.

Mines throughout this district are working a little better, business having been poor for some time.

Belleville—It is rumored that a deal involving the transfer of more than $5,000,000 worth of coal lands including 30 mines on the Illinois Central R.R. between Belleville and Coulterville, Ill., will be consummated within the next 30 days. It is said that already options on 25 mines in the Belleville district have been given a French syndicate which is seeking a strong foothold in this region. The list includes among the larger mines Marissa, Coulterville, Freeburg, and New Athens.

MISSOURI

Kansas City—The chief stumbling block between the Southwestern Interstate Coal Operators' Association and the mine workers of Missouri, Kansas, Arkansas and Oklahoma was removed recently when a method of conducting future arbitrations was adopted. The new plan is modeled after that in effect in Illinois and one or two other states. It does away with the one-man board of arbitration, and provides for a board of six men in each district. Three operators and three representatives of the U. M. W. of A. will constitute the board. John Steel, of Pittsburg, Kan., has heretofore held the office of arbitrator. Many of the miners are anxious for him to finish his term. The wage scale and other matters are now being taken up by the association and miners.

ARKANSAS

Fort Smith—Franklin Bache, head of the Bache-Denman Coal Co., was appointed receiver for nine companies on July 25, following a voluntary petition filed in the United States District Court at Fort Smith. The companies affected are: Coronado Coal Co., Mammoth Vein Coal Co., Mammoth Vein Coal & Mining Co., Prairie Creek Coal & Mining Co., Hartford Coal Co., Bache-Denman Coal Co., Sebastian County Coal Co., Denman Coal Co. and Kali-Inla Coal Co. Five of the companies lost their surface plants in a riot on July 17. As a result of this destruction of property, 71 indictments have been returned by the Sebastian County grand jury. At least two employees of the coal companies were killed.

TEXAS

Fort Worth—The old wage scale existing between District No. 21, U. M. W. of A., and Texas operators, was renewed at Fort Worth on July 24. A new arbitration plan was adopted, providing that an arbitrator shall act at the scene of the trouble and that either side can appeal from his decision to the general arbitration board of three miners and three operators.

FOREIGN NEWS

Berlin, Germany—The Kaiser Wilhelm Institute for coal mining research will shortly be opened in Mülheim-im-Ruhr. This institute is a branch of the Kaiser Wilhelm Society for Scientific Research, of Berlin, but its scope is so important that it has been established as an independent concern. The municipality of Mülheim-im-Ruhr which is in the heart of Germany's richest coal belt has provided $175,000 for erecting the institute building.

PERSONALS

J. P. Crutsinger, manager of the Exchange Coal Mining Co. of Wellington, Mo., has resigned to locate in Mexico. He has been succeeded by Henry Mignery.

Charles K. Scull, a prominent coal merchant and secretary of the Philadelphia Coal Exchange, was elected Imperial Modoc, the highest ranking office, at a recent meeting of the Order of Kokoal.

J. D. Cain, of Pineville, Ky., has been appointed Assistant State Inspector of Mines for a term of four years, beginning Aug. 1. Mr. Cain succeeds Perry V. Cole, also of Pineville, and who has held the office for some time.

A. W. Hesse, formerly assistant chief engineer with the Consolidation Coal Co. of Fairmont, W. Va., has accepted the position of manager with the Lincoln Coal Mining Corp., a new concern with mines located at Big Creek, W. Va.

John O'Conner, who for 10 or more years has been identified with the office of the Rochester & Pittsburgh Coal Co., at Punxsutawney, Penn., has gone with the Brush Creek Coal Co., at Aultman, Indiana County. His new position will be auditor and assistant treasurer.

Hywel Davies, of Louisville, formerly one of the best known coal operators in the state, now business manager of the Kentucky State University, recently underwent an operation for appendicitis at the Good Samaritan Hospital, at Lexington. He is reported to be progressing favorably. He was one of the mediators selected to try to bring about a settlement of the recent Colorado mine troubles and formerly was president of the Kentucky Mine Operators' Association.

RECENT COAL AND COKE PATENTS

Boiler. A. C. Wood, Philadelphia, Penn. 1,097,599. May 19, 1914. Filed May 14, 1913. Serial No. 767,511.

Mine Door Closer. T. Ramsey, Roslyn, Wash., 1,100,690, June 16, 1914. Filed July 17, 1913. Serial No. 779,643.

Gas Producer. C. Whitfield, London, Eng. 1,096,774. May 12, 1914. Filed Feb. 3, 1914. Serial No. 816,163.

Ash Pit Dumper. T. E. McCall, Wilmington, Del., 1,100,982, June 23, 1914. Filed Oct. 31, 1913. Serial No. 798,417.

Mining and Loading Apparatus. F. Billings, Cleveland, Ohio. 1,095,786. May 5, 1914. Filed Jan. 17, 1910. Serial No. 538,408.

Coal Washer. Henry Cory, Dormont Borough, Penn. 1,095,817. May 5, 1914. Filed Mar. 25, 1913. Serial No. 756,691.

Automatic Stoker. W. C. A. Henry, Columbus, Ohio. 1,096,106. May 12, 1914. Filed Aug. 7, 1912. Serial No. 713,924

Apparatus for Cleaning Smoke. J. D. Jackson, Kensington, Australia, 1,100,307, June 16, 1914. Filed Aug. 26, 1913. Serial No. 786,763.

Coal Washer. H. Shannon, assignor to Link-Belt Co., Chicago, Ill., 1,100,921, June 23, 1914. Filed Sept. 7, 1907. Serial No. 391, 762.

Drying Coal Slimes. H. Brune and H. Horst, Neustadt-on-the Hardt, Germany, 1,100,710, June 23, 1914. Filed Oct. 28, 1912. Serial No. 728,272.

Mining Machine. A. H. Gibson, assignor to Ingersoll-Rand Co., New York, N. Y. 1,096,031. May 12, 1914. Filed Sept. 7, 1912. Serial No. 719,186.

Device for Emptying Upright Coking Chambers. A. Gohmann, Stettin, Germany. 1,095,725. May 5, 1914. Filed Jan. 17, 1913. Serial No. 742,548.

Apparatus for Consuming Smoke in Locomotive Furnaces. G. de Grahl, Zehlendorf, Germany. 1,095,629. May 5, 1914. Filed July 22, 1912. Serial No. 710,971.

Gas or Smoke Washer. O. M. Foster, assignor to American Smoke Washing Co., Cleveland, Ohio. 1,096,501. May 12, 1914. Filed July 8, 1912. Serial No. 708,133.

Means for Utilizing the Residual Heat of Coke Produced in Vertical Gas Retorts. H. J. Toogood, Elland, England. 1,101,477, June 23, 1914. Filed June 25, 1912. Serial No. 705,766.

CONSTRUCTION NEWS

Macdonaldton, Penn.—The Brothers Valley Coal Co. has placed a contract with the Roberts & Schaefer Co. for the building of a second Marcus patent coal tipple, which will be installed at Macdonalton, Penn.

Pottsville, Penn.—It has been unofficially stated that the Philadelphia & Reading Coal & Iron Co. will in the future plan to erect a large power house at Pottsville, which will supply power to all parts of the Schuylkill Valley, and down as far as Philadelphia.

Huntington, W. Va.—Three large coal mines will shortly be opened on the Main Island Creek branch of the Chesapeake & Ohio R.R. Hunt & Forbes, the wellknown firm of contractors have closed contracts with the mining companies to lay side tracks to the new mines.

Baltimore, Md.—The city is now preparing a plan for harbor dredging that will enable deeper draught vessels to come into the inner harbor. This will permit some of the larger vessels to coal at the Locust Point pier of the B. & O. instead of lightering fuel or going to Curtis Bay.

Herrin, Ill.—The Chicago & Carterville Coal Co. has awarded a contract to the Roberts & Schaefer Co. for the rebuilding of its complete coal mining plant, recently destroyed by fire (the original plant having been built by the same company), at an approximate contract price of $20,000.

Sparrows Point, Md.—The efficiency of the plant of the Maryland Steel Co. is expected to be materially increased by the addition of 120 coke ovens, to its already large equipment. One-half of these ovens were recently completed and placed in operation, the output being estimated at 500 tons daily.

Paducah, Ky.—The West Kentucky Coal Co. has been given a contract to build six barges at its plant here for the Paducah & Illinois R.R. Co., which is building the bridge at Metropolis, Ill., 12 miles below here. The cost will be $12,000. Aside from these barges, which will be used in building the bridge, the railroad company has bought three others.

NEW INCORPORATIONS

Covington, Ky.—The Pittsburgh Mining Co. has increased its capital stock from $24,000 to $30,000.

Hazard, Ky.—The Middle Fork Coal Co. has been incorporated here by B. P. Wooten, C. G. Bowman and Jesse Morgan.

Prestonburg, Ky.—The Big Sandy Consolidation Fuel Co. has been incorporated with a capital of $250,000. The incorporators are, B. F. Friend, C. R. Brown and D. C. Outcalt.

Welch, W. Va.—The Pocahontas Engineering, Mining & Construction Co. has been organized for the purpose of engaging in mine construction work. The capital stock is fixed at $25,000.

Foxholm, N. Dak.—The Foxholm Coal Co. has been organized with a capital stock of $10,000. The incorporators are J. A. Kann, R. W. Kann and John P. O'Leary, of Foxholm, N. Dak.

Athens, Ohio—The Del Carbon Coal and Coke Co., of Buffalo Creek, W. Va., has been sold to Alexander Cunningham and Charles R. Neidlinger, of New York City. The consideration is not given.

Sesser, Ill.—The Jesse Dimond Coal Co. has been organized with a capital stock of $100,000 for the purpose of mining coal, manufacturing coke, brick, etc. The incorporators are, E. N. Rea. H. M. Rea, and Jesse Dimond.

Charleston, W. Va.—The Kanawha Valley Coal Co. was recently incorporated with a capital stock of $25,000, to engage in coal mining. Those interested are Otto J. Cox, Roy Cox, John A. Field and S. P. Richmond, all of Charleston.

Esserville, Va.—The J. A. Esser Coke Co. has been incorporated with a capital of from $50,000 to $100,000, the purpose of the organization being coal mining and coke manufacturing. The officers are, John A. Esser, pres., George H. Esser, vice-president and Esther F. Esser, secy., all of Norton, Va.

INDUSTRIAL NEWS

Washington, D. C.—The Navy Department recently awarded to S. F. Hayward & Co., of New York City, an order for 30 sets of Westfalia rescue helmets for use on government colliers.

Ottawa, Ont.—The number of people in Canada affected by industrial accidents during June were 593. Of that number 299 were killed, and 294 seriously injured. Owing to the Hillcrest disaster, the mining industry heads the list with 200 killed and 27 injured.

Pittsburgh, Penn.—With coal operators assembling large tows in the local harbors preparatory to a shipping stage, it is estimated that at least 18,500,000 tons of coal will be ready to be moved as soon as sufficient water arrives. Little immediate change in the rivers is, however, anticipated.

Whitesburg, Ky.—Stone, a new mining town in Pike county, is to have a national bank with a capital of $50,000, according to information available here. This institution is expected to begin business before the end of August and will give Pike county its fifth bank. The four others are all doing a flourishing business.

New Florence, Penn.—Several hundred acres of valuable coal land have been transferred recently in this vicinity to interests believed to be from Bolivar. It is said that a number of new openings are to be made in the near future which will mean a decided boom in business and population. Most of the coal involved lies under what is known as the old Graham farm.

Rockport, Ind.—Residents of the Ohio Valley near here are digging quantities of coal out of the bed of the Ohio river. The coal is part of 15 barge loads which were in tow of the "Sprague" several years ago and which were swamped during a severe storm. This summer for the first time since the tow was wrecked has the river been low enough to get at the coal.

Columbus, Ohio—The Ohio Utilities Commission has approved the application of the Chesapeake & Ohio Northern R.R. Co. to issue stock to the amount of $50,000 for the purpose of securing a right of way for the new line to be built by the Chesapeake & Ohio from Portsmouth to Columbus. It is expected that the contracts for the construction of the line will be awarded within the coming month.

Birmingham, Ala.—A foreclosure deed transfering the properties of the Markley Coal Co. to the State of Alabama was recently filed in the Probate Court. The state bought in the property for the use of the Alabama Girls Technical Institute. The price paid was $135,645.89 and the property involved includes 9514 acres of land located in Jefferson and Tuscaloosa Counties. The mortgage under which the property was sold was for $148,763.24.

Trenton, N. J.—Upon the application of Edward D. Fox, Vice Chancellor Beckes on July 21, named Frank D. Schroth, of Trenton receiver for the Eggette Coal Co., of Trenton and Camden. The concern was incorporated with a capital of $100,000 for the purpose of manufacturing artificial fuel. Fox charges that the company has practically suspended business, and that for some time preceding this suspension business was conducted at a loss.

St. Louis, Mo.—Contracts for 80,000 tons of coal for the City Water Works and the City Sanitarium were recently let, at a total cost of $117,156, a saving over last year's prices of $4150. There were eight bidders. Donk Bros. got 50,000 tons of coal for the City Water Works at Bissell's Point at $1.39 f.o.b. cars Bissell's Point. The freight rate on this is 52c. per ton. They also got 10,000 tons of washed coal for the City Sanitarium, at $1.56½ per ton delivered. The Bald Eagle Mining Co. got 20,000 tons of nut coal at $1.60 per ton, as compared with a price of $1.62 last year.

Bristol, Tenn.—The Virginia & Southwestern Ry., one of the important coal carrying lines reaching the southwest Virginia coal fields, has received its first consignment of 600 modern steel coal cars, which will be put into service immediately. The new equipment will be used in hauling coal from the mines of Virginia, particularly from Lee and Wise counties. R. Loyall, who has general supervision over the middle district of the Southern, commenting on the new equipment, said that it would make the Virginia & Southwestern one of the best equipped coal carrying railroads in the country.

Coal Trade Reviews

General Review

Anthracite trade touches the low point of the year. Firmer tone and improved sentiment in bituminous. Stocks exhausted and buyers finding they have overstayed the market.

Reports from some points indicate the dullest situation in the hard-coal trade for the past decade. The large companies are working on a heavily curtailed schedule, consumers are showing no disposition to stock up and the individuals are making deep cuts into the regular circular, in some cases even down to the April prices or better. A slight temporary activity prevailed during the past week in anticipation of the regular advance in the circular on Saturday, Aug. 1. Aside from this the situation has been most depressing and the increase in the circular will tend to discourage further buying for the time being.

Contradictory crosscurrents are developing in the Eastern bituminous situation which are strongly indicative of a change in sentiment. An easing off in the demand from the West has diverted more coal into the seaboard market which has been a depressing influence, but on the constructive side it is noticed that the heavy reserve stocks, which has been a constant menace to the market for so long, are completely exhausted. There is a growing belief that many consumers have overstayed the market. The rigid curtailment in operations has kept shipments well inside of market requirements, and there is little consignment coal reported at any of the large distributing centers, while generally stiffer prices are quoted on contracts.

The Pittsburgh district is showing a tendency to drag behind, there being no increase in mine operations although the reduced stocks in consumers hands has induced slightly better buying in the line trade. Prices are still subject to heavy cuts, but with the greater industrial activity and heavier Lake shipment through August, the outlook is more hopeful; tonnage will have to experience a big increase, however, before the improvement will be reflected in the prices. The improved sentiment still continues in Ohio. The trade his tightened up in excellent shape and there is a fairly good domestic business ready when the local mines get under operation. A fair sprinkling of idle factories are beginning to fire up while the railroads are placing additional orders.

The Southern railroads have also increased requisitions somewhat which has had a stimulating effect on the market as a whole although there is little improvement in the general industrial call. Prices continue steady so far with increases freely predicted for the near future.

The Middle Western market has taken another spurt and with normal conditions prevailing will show a steady and consistent increase from now on into the fall. The harvesting is on in full swing while prices are steadier and the improved sentiment is creating more buying in all lines. Substantial advances in quotations are anticipated during the next few weeks. The summer buying was considerably below the average and more than a normal tonnage will be required to make up the deficiency.

ATLANTIC SEABOARD

BOSTON

Price situation on Pocahontas and New River being corrected, but tonnage will be light for some time. Improvement in call for Pennsylvania grades continues. Georges Creek firm, with better trade conditions in sight. Anthracite dull and price shading on part of independents so far without result.

Bituminous—August promises some relief to the price situation, but the volume of Pocahontas and New River coming forward will probably be light. The operators are now apparently reconciled to the strictest kind of curtailment, and it is understood that cargoes will not be put afloat by the various agencies without firm orders in hand. Meanwhile, practically all of the distress coal at New England ports has been absorbed in one way or another and on car prices for inland delivery have been restored to the season-contract basis. For some weeks, therefore, there will probably be very little business aside from the large consumers, who are taking coal regularly in weekly proportions. It is gratifying to the trade generally that the bad July situation has been corrected, and all hands will now look forward to a better fall market than could have been forecasted a month ago.

The slight improvement noted last week in the demand for the better Pennsylvania grades continues to hold good. Buyers who have been awaiting developments and hoping for lower prices are now concluding to take on supplies, and the effect is already noticeable. The strengthening in the Hampton Roads coals will also have a favorable result on the market for Cambria and Somersets. Some of the operators report plenty of current business and it begins to look as if bituminous generally in a month or so would be over the hump.

There is no feature in the Georges Creek demand, although the shippers see signs of an increasing number of requisitions during August. Barges and steamers carrying this grade have been operating regularly and there is no change to report on prices.

Anthracite—The trade continues as dull as usual in the midsummer season. A rigid curtailment has been in force with most of the mining companies and shipments have been relatively few the past fortnight. Independent operators are circularizing this territory with offers of domestic sizes at concessions from the companies' lists, but so far they have made very little headway. This market has always been loyal to the interests that serve it best in times of stress, and the mere concession in dull times of 25c. or even 50c. does not interest more than a few of the dealers to the point of buying.

The Cape Cod ship canal was formally opened with appropriate exercises on Wednesday, July 29 ,a large party going from Boston to participate.

Current prices on bituminous at wholesale are about as follows:

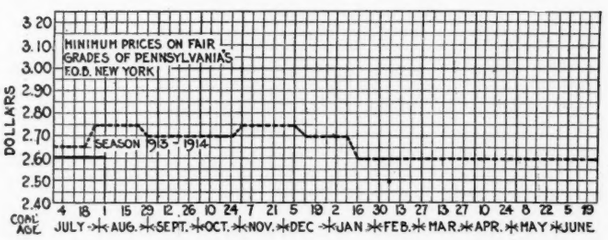
	Clearfields	Cambrias Somersets	Georges Creek	Pocahonta* New River
Mines*.....	$0.90@1.45	$1.20@1.65	$1.67@1.77	
Philadelphia*.....	2.15@2.70	2.40@2.90	2.92@3.02	
New York*.....	2.45@3.00	2.70@3.20	3.22@3.32	
Baltimore*.....	.....	.....	2.85@2.95	
Hampton Roads*.	.....	.....	.....	$2.75@2.85
Boston†.....	.....	.....	.....	3.58@3.65
Providence†.....	.....	.....	.....	3.68@3.78

* F.o.b. †On cars.

NEW YORK

Indications of an improvement in bituminous. Calls on contracts picking up and reserve stocks generally exhausted. Usual month-end rush for anthracite creates some activity, but operations still heavily curtailed and trade slow.

Bituminous—Distinct evidences of an impending improvement are discernible in the local soft-coal trade. There is a growing belief that many consumers have overstayed the market and that a broad buying movement will be initiated shortly which will put the trade on a firm basis. The heavy reserve stocks accumulated early in the year, which have since



been a constantly depressing feature in the market, are now generally cleaned up; as a result requisitions on contracts are larger all along the line, and a few inquiries for prompt shipment are beginning to drift in.

A rigid curtailment policy on the part of the operators

has kept the movement down to actual requisition so that no demurrage coal is in evidence, and there is a healthy situation prevailing as regards the stocks at tidewater. Indications of an improvement in industrial conditions is also noted in the better demand on contracts which may be due in part, however, to the final cleaning up of surplus stocks. Although still quiet, the last half of July witnessed a generally accumulating strength which finds the current month opening with the trade even moderately active and indications of a further improvement later. Prices are somewhat steadier on the basis quoted for the past few weeks, which are as follows: West Virginia steam, $2.50@2.60; fair grades Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—The end of the month bringing with it the customary advance on the domestic grades, created the usual small rush of orders from consumers anxious to get in at the expiring low rate. Aside from this the market continues inactive. Nearly all the large companies reduced operations to little more than half capacity last week, the only important exception being the Lehigh Coal & Navigation Co., which continued at full time throughout the week. The independents, by forcing the market with heavy cuts on the company circulars, are doing much better. As a result of the regular monthly advance in the circular, effective on Saturday, a further restriction in the demand during the coming week is anticipated.

The shortage of stove coal continues the predominating feature in the market. The companies are still taking advantage of this deficiency to accelerate the movement of the heavier grades such as egg and chestnut, only recognizing orders for stove coal when accompanied by requisition for a certain proportion for other sizes. The output of the steam grades is so restricted, as a result of the curtailed mining operations, that the entire production is going into the market and practically none is being put back into storage now.

We quote the New York hard coal market with the company circular 10c. higer on the domestic grades, as follows:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.00	$4.60@5.00	$4.95	$4.55@4.95
Egg	5.25	4.90@5.25	5.20	4.85@5.20
Stove	5.25	5.15@5.25	5.20	5.10@5.20
Chestnut	5.50	4.95@5.50	5.45	4.90@5.45
Pea	3.55	3.40@3.55	3.50	3.25@3.50
Buckwheat	2.80	2.60@2.80	2.50@2.75	2.10@2.75
Rice	2.30	2.15@2.30	2.00@2.25	1.60@2.25
Barley	1.80	1.60@1.80	1.75	1.25@1.75

PHILADELPHIA

Anthracite trade still dull and featureless with operations at only 50% capacity. Concessions freely made by individual operators. Bituminous shows better inquiry, but little doing in way of new business.

Anthracite—The first of August finds the anthracite trade passing through one of the dullest periods it has experienced for the last ten years. Inactivity in almost all sizes is noted, with the possible exception of broken and stove; the curtailed operations at the mines has made the market very short of the former, and it requires considerable jockeying to fill contract requisitions. Stove coal has its uses also, in that orders for it carries some of the other sizes, but the trade as whole is exceedingly dull. The slack demand for pea size, which is used to a great extent in this market for domestic purposes, still continue and it is understood, even with the half-time work at the mines, that considerable of it continues to go into stock. The circular price of $2.50 at the mines, is being cut right and left by the individual operators, who, however, are not confining their efforts to this one size. Concessions on egg and nut in some cases net the operator less than April circular, and this condition of affairs is not likely to change for the next six weeks. Dealers and operators generally in this vicinity are looking for an earlier fall demand than is usually the case.

Bituminous—There seems to be a better inquiry in the soft-coal market, but little is developing in the way of actual orders. Spot coal is not easy to dispose of, even at the prevailing low prices, but even in the face of this, inquiries for contracts are met with substantially higher quotations than those ruling at present. This is not likely to improve a condition now existing, when establishments can buy on the market at considerably less than they can contract. It is the feeling among the operators that late fall and winter will see substantial increases in the prices on all grades of bituminous.

BALTIMORE

Anthracite men complain that many customers are not covering. Bituminous market conditions continue highly unsatisfactory. Export trade holds up.

While the early weeks of the summer saw the anthracite men fairly cheerful under the belief that the light demand for coal for storage as well as for immediate use would soon see a change, a different spirit now prevails. It is undoubtedly a fact that far less coal has been placed in bins this year than for a number of years past. Neither is there much of a disposition on the part of consumers now to take advantage of the remaining low prices, and a rather dull August seems to be in prospect. There is no explanation as to why the household consumer, who is usually in at this time, is still holding off. Light manufacturing call is, of course, understood in the face of the poor industrial situation generally.

Highly unsatisfactory conditions prevail in soft coal. Call to the West has slackened somewhat, and little or no market exists East, outside of contract business. With this at low ebb there is not much satisfaction in it for the coal man. Prices are hard to fix in such a market, but prompt sales, not under pressure, are about on a level with the previous week. In West Virginia, steam coals sold around 90c.; three-quarter-gas sold variously at from 80 to 90c., and slack was disposed of in some cases at 65c. Pennsylvania coals range at from 95c. to $1.35. The market was poor for all. Bunker trade is about the most healthy business here just now.

HAMPTON ROADS

Dumpings for the week are light. Government takes 10,000 tons at Newport News. No change in prices. Improvement anticipated this week.

Coal movement from Hampton Roads during the last week has not been heavy; in fact there have been days during the week when all piers were practically idle. The largest cargo was taken by the collier "Orion' loaded at Newport News, and outside of several large cargoes to Naples and Genoa the foreign movement was light. In addition to the shipments to Italian ports, foreign cargoes went to Bridgetown, Coronel and St. Thomas.

The demand for all classes of coal still continues light and there is little inquiry in the market at this time for either coastwise or foreign spot business. The greater part of the cargoes moving coastwise went to Boston although there were some shipments to Providence and Portland and some small lots to one or two of the Southern ports.

There is no change in prices in any of the grades. Prospects are good, however, for some improvement in dumpings during the coming week, a fair number of vessels being due for shipments moving on contract. The U. S. Collier "Proteus" is due to load about 10,000 tons applying on the contract recently let by the government.

CHARTERS

Coal Charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tonnage	Rate
Oclande[2]	Norwegian	Philadelphia	Martinique	1874	.....
Venetiae[2]	British	Baltimore	Port Limon	2333	.....
Waltham[1]	.....	Norfolk	Jacksonville	449	.....
Lord Ormondee[2]	British	Atlantic Range	Barcelona	2533	$2.94
Frednese[2]	Norwegian	Baltimore	Guantanamo	998	.....
D. H. Riverse[1]	.....	Baltimore	Martinique	963	.....
Parkgatee[2]	British	Atlantic Range	Barcelona	2050	.....
Wm. B. Herricke[1]	.....	Philadelphia	Calais	475	1.10
Wm. H Yerkese[1]	.....	Norfolk	Providence	1211	.....
Fannie Palmere[1]	.....	Baltimore	Portsmouth	1726	.....

[1] Schooner [2] Steamer

LAKE MARKETS

PITTSBURGH

No recent change in production, which is running about 10% better than in June. Further increase expected in August. Prices on prompt coal still very irregular, but slack has slightly advanced.

There has been no change in the rate of mining in the Pittsburgh district in the past two or three weeks. As a general average, the mines are running at a trifle better rate than in June by perhaps 10%, and operations average between 60 and 65% of normal capacity. There has been an increase since June 1 of about 10% in the line trade, due to the reduction of consumers' stocks rather than to any increase in the rate of consumption, and there has been a slight increase in Lake shipments. Demand for coal is expected to be considerably better in August. Manufacturing operations are expected to increase, while the Lake trade should take a larger tonnage.

Prices on prompt lots are being deeply cut by the smaller shippers, as for many weeks past, and there is no established market. It may be stated that odd lots of mine-run

could be picked up at $1 to $1.10, and possibly at less. Slack, however, shows a slightly firmer position in the past ten days. A fortnight ago slack could be picked up in considerable quantities at 50c., but it is stated that at present nothing below 60c. could be done, and it would not require the buying of any considerable tonnage to exhaust all available at this figure, putting the market to 65c.

An indication of the improvement in the position of slack with respect to production and consumption is found in the experience of the Pittsburgh Coal Co. This interest never sells slack at cut prices in the summer, but stocks what is necessary during the Lake shipping season, to carry its contracts through the winter, when production of slack is decreased through the cessation of Lake shipments. For five or six weeks past this interest has not stocked any slack, but is able to dispose of its current production by shipments on its regular contracts. Circular prices remain as follows: Slack, 80@90c.; nut and slack, $1.05; nut, $1.25; mine-run, $1.30; ¾-in., $1.40; 1¼-in., $1.50, per ton at mine, Pittsburgh district.

BUFFALO

Movement a little better in bituminous, but anthracite as dull as ever. Expected that the fall crop movement will produce a stir, if only by creating a scarcity of cars. Mine shipments made only on specific orders. Short time operations the rule.

Bituminous—There are a few members of the bituminous trade who find their shipments on the increase. Prices are not affected, but that is to be expected, as the volume must increase very materially before this occurs. Still dealers are encouraged, for they believe that the fall situation, especially the crop movement, must help all sorts of business. Besides it will create a scarcity of cars and that alone will advance the price of coal. All members of the trade are carefully watching for the time when the railroads begin to buy. When that happens the worst will be over. Some difference of opinion exists as to the fuel supply of the roads, but it is the general idea that they are using more than they are buying.

The late improvement in slack has been ascribed to the light Lake movement of bituminous. This is likely to continue because of the small storage capacity at Upper-Lake ports. There is a close watch kept on shipments from all mines, for there have been too many losses on coal standing on track. Mines are running on short time and if there are no orders they shut down.

The state of the market is not well represented by quotations, as practically all coal would bring the full circular if business was brisk. When it is not, only the best sells on regular quotations, which are $2.80 for Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack. The demand for slack is somewhat better than it was. Allegheny Valley sizes are about 25c. lower than Pittsburgh, slack being on a par with it. There is considerable low grade slack coming in from beyond Pittsburgh, which sells very cheap.

Anthracite—The trade is improving. Some shippers note that there is great surplus of egg, which embarass the mines considerably. Because of this or some other reason the mines have not furnished coal enough during the week to keep the docks busy and the Lake shipments have fallen off, though the July total still promises to be high. No prospect of improvement in the local rail-line trade appears at present.

Shipments by Lake for the week were 167,000 tons, practically all to principal Upper-Lake ports. The smaller ports have dropped off for awhile, probably till early fall, when they will return for their final cargoes. It is at present merely a matter of cheap Lake rates, with the leading shippers also quite aware that it is out of the question to get enough coal west of Lake Michigan by rail if the Lake docks are not well filled up during the season. The Lake fleet is so pushed for business that the coal shippers easily make their own rates and take their time in fulfilling charters.

COLUMBUS

Domestic consumers showing a disposition to stock up earlier than usual, and these grades are strong. Steam coals slower owing to high quotations on the Ohio product. Local producers still anticipate a big business in the Lake trade.

Domestic demand is the strongest feature of the trade. Dealers' stocks are generally short and they have experienced an exceptionally good call for this time of the year. Consumers are inclined to stock up earlier than usual and are only waiting for the resumption of work in the Ohio mines. Sales agents of the larger operating and shipping concerns are out in their territories taking orders for delivery as soon as possible. Dealers are selling a large amount of the fancy grades such as Pocahontas and re-screened varieties. Retail prices are firmer at the levels wich have prevailed since July 1.

There is some demand for steam grades, but users are generally getting a sufficient tonnage from West Virginia and Kentucky. Prices of these coals are lower than Ohio quotations up to date. The business depression still has its influence upon the steam trade and the consumption is not increasing very rapidly. Fine coal is rather low and some quotations on nut, pea and slack have been made as low as 50 cents.

Some help is expected in the Lake trade when coal is again produced. Although four months of the season have passed, Ohio operators are still looking to an active trade for the remainder.

Prices in the Ohio field are:

	Springfield	Franklin Co.	Clinton	W. Va.
Domestic lump	$2.07	$2.40@2.55	$2.12	
Steam lump	1.87@1.92		1.97	
Egg		2.40@2.55		$4.05
Mine run	1.87	2.15@2.25	1.87	3.30
Screenings	1.57@1.62	1.85@1.95	1.57@1.67	

TOLEDO

More inquiries and an improved sentiment in the trade. Idle factories going into operation and railroads are placing orders. Status of the labor trouble.

The market is showing a strong tendency toward improvement. Inquiries are coming in more freely and orders are more frequent. Prices remain the same but some dealers report encouraging signs of greater strength. The betterment in general business conditions seems to be coming from the West and is rapidly working Eastward. The idle factories are beginning to open up and there is every indication that the plants will soon be operating as usual. Railroads are also beginning to place orders.

The mine situation is looking better and operators generally are hopeful that affairs may soon reach an amicable adjustment. This has been strengthened by the fact that the United Mine Workers of America came to the rescue of the operators against the I. W. W.'s who were causing all kinds of trouble at the mines. The United Mine Workers have acted as special deputies and largely through their assistance the pumps and fans are again working at the mines and immense waste has been prevented.

CLEVELAND

Lake shipping still further reduced and production now even less. Prices holding wonderfully firm, with only occasional important concessions reported.

Coarse coals are, if anything, a little weaker than they were a week ago, while slack is slightly stronger. This is due entirely to further curtailment of lake coal shipments, which are smaller in some instances than a week ago. During the last week the Northwestern Fuel Co. reduced shipments to such a low point that not even vessels that are under charter are needed. With each reduction the mines are forced to cut down production and surplus coarse coal must be offered on the open market. The output of slack is still further reduced and the result is a stronger market with no great demand.

Youghiogheny operators are holding out for better prices on screened coal than other districts.The bargain prices reported are mostly for tonnages that must be moved quickly. There is very little local demand for domestic fuel. Sales of Pocahontas are being reported, but largely to the Chicago market. The Western demand is keeping the market up locally.

Quotations for shipment are as follows:

	Pocahontas	Youghiogheny	Fairmont	West Va., No. 8
Lump	$3.60			
Egg	3.60			
Lump, 1¼-in.		$2.50		
Lump, ¾-in.		2.20@1.25	$2.05	$2.05@2.10
Mine-run	2.60	2.15	1.95	2.00
Nut		2.20		
Slack	2.20@2.35	1.65@1.70	1.70	1.65@1.70

CINCINNATI

Better feeling prevails although immediate business has not improved. Price concessions have ceased. Strong market anticipated this fall.

There is an improvement in the general tone of the market, due largely to the fact that coal men are able to see signs of a revival in industrial activity. So far this has not manifested itself by any marked increase in the local consumption of the steam grades, although there seems to be a general opinion that a better market is not only in sight, but is actually beginning. The trade has consequently tightened up considerably and all talk of price concessions are past.

The domestic market continues in excellent shape, partly by reason of the restricted production due to the slow steam trade, and partly because the demand is steadily improving. When the steam market revives, as is expected at any time, a period of greater activity than at any time since the early part of last winter is confidently expected.

DETROIT

Market slow and quiet, but generally firm. Shortage of labor. Heavy business anticipated this fall.

Bituminous—The local market has been slow, yet not particularly bad; steam trade has been passibly good in the city, the smaller sizes being in a little better demand and prices steadier than for several weeks past. The domestic trade has fallen off, due to the inability of the dealers to secure labor to unload the cars as a result of the heavy demand along other lines that are now starting up. Operators and shippers expect that this will make an extra heavy demand later in the season and it will tax them and the railroads to deliver coal promptly when ordered. Pocahontas has shown marked improvement this week and shippers are exceedingly well pleased with the outlook.

Anthracite—Anthracite trade was good for the month of July and shippers are now somewhat behind in filling orders for egg and stove coal. Considerable increase in orders for immediate shipment is anticipated for the first part of this month.

COKE

CONNELLSVILLE

No demand and market softer. Producers ready to make special concessions. Consumers well supplied.

The market for furnace coke has softened, there being operators so anxious to dispose of additional tonnage that they are quoting on contract about 10c. less than 10 days ago. There is no demand for coke, the present consumers being well supplied. In two or three instances August coke may have to be bought, but several consumers are covered to Sept. 1 and others through the year. In the circumstances one prominent seller has been negotiating with three or four idle furnaces on the proposition that they blow in now, with cheap coke and ore, and accumulate some pig iron. It is understood that coke would be offered for the balance of the year at $1.75. Contracts were made in May at $1.85 and $1.90, and in June three contracts, for 27,000 tons a month, were made at $2 for a particularly desirable brand. Prompt coke could easily be had at $1.75. Foundry coke is offered at $2.25@2.35 for fairly good brands, while standard brands on contract are available at $2.35@2.50 per net ton at ovens.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended July 18 at 268,200 tons, an increase of 3595 tons, and shipments at 258,762 tons, an increase of 1655 tons. Production exceeded shipments in the week by 9438 tons, according to the report, while the accumulated surplus for 17 weeks is now 52,103 tons, according to the weekly figures published.

BIRMINGHAM

This week has brought about no change in either furnace or foundry coke. Although the foundry grade is moving slowly, sales are being made only in small lots, while there is no tonnage of furnace coke being sold.

BUFFALO

No dealer has of late pretended that there was any strength to the coke market, though it is hard to say why it should lag behind coal. One shipper reports that when he orders a car it is only a day or two before he gets the car numbers; another hears from the operator that though the ovens have been shut down a month there is still plenty to ship. Quotations remain weak on the basis of $4.25 for best 72-hr. foundry and $3.25 for stock coke.

DETROIT

This product has been in fair demand within the last two weeks. Foundries that have been entirely shut down are resuming work again and some of them are actually working over-time. This has had a tendency to advance Connellsville coke on this market from $2.75 to $3, and in some cases to $3.10 for spot shipment. Solvay is now quoted at $2.25 and gas house at $2.80 f.o.b. ovens.

NEW YORK

Coke is reported somewhat steadier, with a slightly better demand. Prices are showing a rising tendency and there is a more optimistic feeling.

SOUTHERN

BIRMINGHAM

Lump coal shows very little change while shipments of steam grades are somewhat larger than last week.

The market on lump coal remains about the same. Very few orders of any size are being received and shipments show only a small tonnage for the week. Steam grades show some improvement in tonnage sold and shipped. Due to several of the railroads increasing requisitions on contracts, shipments are heavier in this line, though the small business shows little improvement. Prices are holding up well and indications point to an increased activity in the steam lines soon.

LOUISVILLE

Market somewhat improved except on the steam sizes. Prices unchanged and operations remain on a half-time basis.

Except for steam sizes the Kentucky coal market is rather active at present, having picked up considerably over the week previous, when the frequency of cancelled orders rather discouraged the operators. General rains and the fact that the farmers had practically completed their harvesting operations, stimulated the demand for domestic coals in the interior and the requirements of this market served to take up the tonnages thrown back on the operators' hands.

The Eastern Kentucky field is having the best of the business, operations and the market in the western section not having picked up to any extent. The mines generally continue to work about half time with little demand for their output. Neither East nor West is there any demand of importance for nut and slack. Prices continue virtually unchanged.

MIDDLE WESTERN

INDIANAPOLIS

Slight improvement again felt, due to crop movement and buying for winter storing. Prices unchanged but this month may show an advance.

There is a more cheerful feeling in the coal industry of Indiana. The movement of the wheat crop is effecting the trade though not making any stir. Farmers have been marketing their wheat freely and spending the money received and this has put a little more ginger into commercial and industrial lines. Factories closed for the summer are reopening here and there, more employees are being taken on at Gary, and the farm implement manufacturers report increased orders, particularly for thrashing outfits. Harvesting is also causing some additional consumption of coal and buyers of domestic grades have begun their winter storing.

All these conditions show in the trade and are bringing July orders up to their normal level. Further increases this month and next will probably cause prices to advance to or near the winter schedule and there will be an effort now to take advantage of the lower quotations. Contracts that have been hanging back are being closed and other buyers are beginning to study the price prospect for their fall and winter buying. There is a slightly better movement of steam, as well as domestic grades and screenings are still hard to get, with prices holding firm near the top. Retail business, seems to be about the average and dealers are satisfied. Car troubles are not worrying the Indiana trade yet but operators like to get as prompt shipment as possible. There is much more wheat to move this season than usual with indications of a large corn crop also.

Prices are unchanged but the current month will probably bring an advance.

CHICAGO

More satisfactory tone due to prospects of an improvement in general business conditions. Harvesting is now in full swing and farmers are beginning to buy coal. Volume of trade in the rural districts steadily increasing.

Considerable improvement has been noted in the smokeless coal trade. The announcement a short time ago that the circular price on mine-run would be advanced Aug. 1 from $1.25 to $1.40 has had a stimulating effect on buying. More of this grade has been sold within the last ten days than during the preceding six weeks, and many retailers who have been taking only a little coal on their contracts are now specifying

more heavily. Although there has been a steady demand all summer for smokeless lump and egg, it is practically off the market now. The operators have not been producing it because they have had no demand for slack and it has been impossible to produce the lump coal even at $2 a ton.

The anthracite situation remains stationary. Retailers are short of money and this will continue until consumers begin to send in their orders.

The market is bare of Hocking coal, as the mines are not yet in production. Orders for Hocking are piling up in large numbers and when business is resumed, it is believed, it will be remarkably active for several months.

Prevailing prices in Chicago are:

	Hocking	Pittsburgh	Pomeroy	Kanawha
Rescreened lump	$1.60		$1.65	$1.50
1¼ inch	1.50		1.50	1.50
¾-inch	1.30	$1.20	1.35	1.30
Nut	1.25		1.35	1.20
Mine-run	1.10	1.05	1.15	1.10
Nut, pea and slack	0.70		0.75	0.65
Coarse slack	0.60	0.60	0.65	0.55

Harrisburg quotations are: Domestic lump and egg, $2.40; steam lump, $2.25; mine-run, $2.15@2.25; screenings, $1.85@1.95; No. 1 nut, $2.55; No. 2 nut, $2.40.

Carterville prices are: Lump and egg, $2.40; No. 1 washed, $2.55; No. 2 washed, $2.45.

ST. LOUIS

Domestic consumers coming into the market and the situation is much steadier. Substantial advances anticipated in the next few weeks. Summer buying has been light and must be made up.

The past week has seen a growing demand from the domestic trade for the higher-grade coals, both in the city and country, and prices are advancing slightly on the steam sizes. From the high-grade field there is a tendency to decline about 5 to 10c. a ton on the screenings, and the washed market is also weak. In a way, the same conditions exist in the Standard field, with the exception that there is no increasing demand for lump coal, although the price is up perhaps 5c. per ton, with chances of going 5c. better in the next week or ten days. On the other hand, screenings have dropped from 80c. to 70c., with indications that 65c. will be reached in the course of the next week.

Retailers advise that their usual July business is away behind this year. Up to the present, not more than one-half of the tonnage usually placed for July delivery has yet been ordered, and this will mean a call for coal in August and September that will tax the capacity of the dealers to take care of.

There was a little spurt during the past week in the demand for Pennsylvania anthracite, but smokeless is still dragging and domestic coke is picking up. It is generally understood that prices on all the high-grade coals will advance on the first of the month about 10 or 15c. a ton on the domestic sizes, these prices being good until Aug. 10. The increased production of Standard lump coal will bring a surplus of screenings into the market that will cause the price on that grade to slump, at the same time forcing the price of lump up.

The present circular is:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump	.....	....	$1.20	$0.80@0.85	$0.95
3-in. lump	.....	....	.....	.....	.....
6-in. lump	$1.15@ 1.35	....	1.30	0.90@1.00	1.15
Lump and egg	1.85@ 2.15	$2.00	.....	....	1.15
No. 1 nut	1.15@ 1.35	....	.....	.....	.....
Screenings	0.70@ 0.75	....	0.80@0.85	0.65@0.70	0.75@0.80
Mine-run	1.00@ 1.15	....	.....	0.75@0.80	.....
No. 1 washed nut	1.50@ 1.60	2.25	1.50	....	.....
No. 2 washed nut	1.30@ 1.40	....	1.35	....	.....
No. 3 washed nut	1.20@ 1.25	....	.....	....	.....
No. 4 washed nut	1.15@ 1.25	....	.....	....	.....
No. 5 washed nut	0.65@ 0.70	....	.....	....	.....

KANSAS CITY

Conditions normal with an upward tendency as the season advances.

Business is above normal in the Southwest, the only disturbing influence at present being the strike which has tied up the Joplin & Pittsburgh railway. However, miners who live several miles from the mines have in a good many cases formed camps near their work. Demand is unusually good for the season, bookings for later delivery being brisk. The market is steady, with an upward tendency as fall approaches. A summer basis is expected to be in evidence for several weeks, however. Coal men discount the recent announcement that the Standard Oil Co. will not sell fuel oil in tank cars in Kansas City after Sept. 1.

PRODUCTION AND TRANSPORTATION STATISTICS

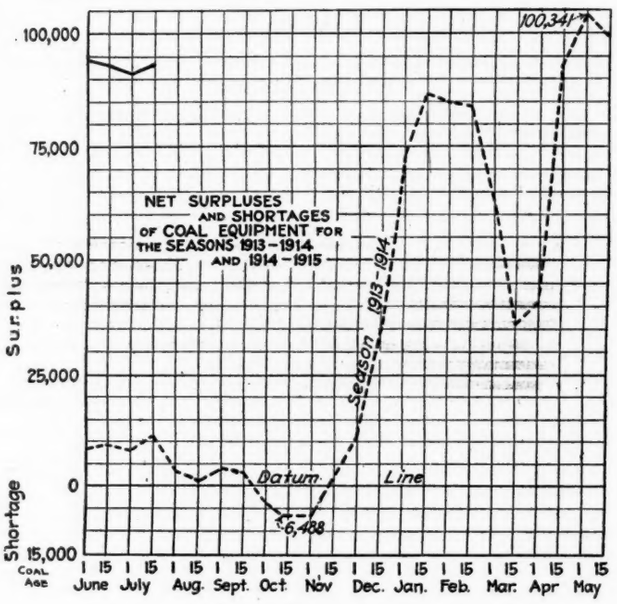
THE CAR SITUATION

American Ry. Association reports surpluses and shortages of coal equipment for two weeks ended July 15, as follows:

	Surplus	Shortage	Net*
New England Lines	1,589	11	**1,579**
N. Y.; New Jersey, Del.; Maryland; Eastern Penn.	23,189	0	**23, 189**
Ohio; Indiana; Michigan; Western Pennsylvania	44,169	0	**44,169**
West Virginia, Virginia, North & South Carolina	6,563	0	**6,563**
Kentucky, Tenn.; Miss.; Alabama, Georgia, Florida	5,710	0	**5,810**
Iowa, Illinois, Wis., Minn.; North & South Dakota	5,933	5	**5,928**
Montana, Wyoming, Nebraska	723	0	**723**
Kansas, Colorado, Missouri, Arkansas, Oklahoma	2,203	154	**2,049**
Texas, Louisiana, New Mexico	122	106	**16**
Oregon, Idaho, California, Arizona	2,858	16	**2,842**
Canadian Lines	0	0	**0**
Total	93,509	292	**93,509**

	Mar. 15	Apr. 1	Apr. 15	May 1	May 15	June 1	June 15	July 1
Surplus	39,133	41,055	92,139	100,370	99,664	94,770	93,520	91,280
Shortage	3,282	615	24	29	313	7	49	430
Net*	**63,428**	**35,851**	**40,440**	**92,115**	**100,341**	**99,351**	**94,763**	**90,850**

***Bold face** type indicates a surplus.



BALTIMORE & OHIO

The following is a statement of coal and coke tonnage moved over this system and affiliated lines during April, May and June of this year and last year:

	April		May		June	
	1914	1913	1914	1913	1914	1913
Coal	2,131,812	2,516,367	2,995,812	2,357,119	2,380,795	3,061,929
Coke	343,862	400,317	301,163	434,898	298,237	396,920
Total	2,475,774	2,913,684	3,296,975	2,792,975	2,769,032	3,458,849

FOREIGN MARKETS

GREAT BRITAIN

July 17—There is no change of note since last reports. Markets continue relatively weak for prompt and firm for ahead.

Approximate quotations:

Best Welsh steam	$5.04@5.28	Best Monmouthshires	$4.08
Best seconds	4.56@4.80	Seconds	3.84@3.96
Seconds	4.20@4.32	Best Cardiff small	2.58
Best dry coals	4.20@4.32	Seconds	2.46

The prices for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those of Monmouthshire descriptions are net f.o.b. Newport; both exclusive of wharfage, and for cash in 40 days.

Coke is quoted at: Special foundry, $6.36@6.72; good foundry, $5.52@6; furnace, $4.92@5.28.